Engineering
Library

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLV
Number 18

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, NOVEMBER 3, 1921

Thirty-five cents a copy
Three dollars a year

CHAMPION TRADE MARK

Champion Dependable Spark Plugs

Establishing the Southern speed record, a Lark model Lexington Standard car equipped with Champion Dependable Spark Plugs, recently defeated the Dixie Flyer from Atlanta, Ga., to Jacksonville, Fla. —a distance of 374.6 miles.

Champion Spark Plug Co.
Toledo, Ohio

Another Victory

Pike's Peak Hill Climb

On Labor Day, Sept. 5th, a Lexington Special No. 7 was piloted to victory in the event for cars of 183 to 300 cubic inches displacement.

"We attribute no small share of our success to the fact that your Champion Spark Plugs were used, and are very pleased indeed to most heartily endorse same, as our exhaustive dynamometer tests have proven, to our satisfaction, that there is no better plug on the market."

Lexington Motor Co.

Champion two piece construction with 3450 insulators and patented gaskets again prove their dependability.

Entered as second-class matter Jan. 2, 1908, at the post office at New York, N. Y., under the Act of March 3, 1879.

WALTHAM SPEEDOMETERS AND AUTOMOBILE CLOCKS

The only Air-Friction Speedometer in the world

"AIR-FRICTION?" Just what is "Air-Friction"? It is a new principle for use in speedometers developed and perfected by the Waltham Watch Company.

Explained briefly — The dial indicator is hung on a shaft in a jewel-bearing and driven by the friction of air generated within the instrument according to the speed of the car. The dial indicates every speed with absolute and instantaneous accuracy.

The safety and satisfaction of the car owner are often seriously affected by the irregularity and unreliability of speed-recording.

A Waltham Speedometer avoids all of these disadvantages. It records every variety of speed instantly and accurately. It is not affected by climatic or temperature changes.

More and more of the leading automobile manufacturers in this country are specifying Waltham Speedometers as standard equipment for their cars. Among such cars are the Cunningham, Daniels, Fergus, Lafayette, Leach-Biltwell, Lincoln, Packard, Pierce Arrow, Renault, Rolls-Royce, Stevens Duryea, Wills-Sainte Claire, and others.

Why not make it a special point to visit the agencies representing any of these cars which are equipped with this truly wonderful Speedometer. A demonstration will prove to you the instant accuracy of the Waltham Speedometer.

Waltham Watch Company, Waltham, Mass.

Service Stations in all leading cities

WALTHAM

The Speedometer of Instantaneous Accuracy

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLV. NEW YORK—THURSDAY, NOVEMBER 3, 1921 No. 18

The Meaning of Service to the Automotive Industry

Service means taking care of the owner; keeping him satisfied. Service and parts will ultimately be handled by whatever agency can do the job most economically. Service industry growing.

By Clyde Jennings*

IT seems rather difficult to get all persons concerned to realize exactly what service means to the automotive industry. Two definitions of service that are very far from the correct one appear to be accepted in many quarters. These definitions, stripped of camouflaging words, are:

1. An opportunity to make money on the person who bought the vehicle.

2. Another name under which the vehicle owner forces you to give him something.

The fact is, that the person who holds either of these definitions to be even approximately correct, has not caught even a part of the spirit that must be put into the service department of the industry.

A proper definition of service does not appear to have been written. Some of the components of service are definitely known. A few of them are:

1. Service must be to the industry what the shoe repairer is to the shoe manufacturer. As long as repairs are more profitable to the owner than new vehicles, they must be supplied at a reasonable price and in workmanlike manner.

2. Service must become a perfectly legitimate business and after the 90-day guarantee period service work must be self-supporting.

3. Service business must necessarily grow with the number of cars in use, which will be at a greater rate than the increase in number and financial importance of the vehicle manufacturing industry. This follows as certainly as the percentage of sales lessens in proportion to the number of cars in use.

4. Efforts to improve service must be to the improvement of all service, for no one manufacturer can ever hope to have enough service stations to care for his vehicles, and they must, if the owner uses his car to the best advantage, at times be at the mercy of the independent service man. It is best that this service man know as much as possible about this car, so that he can send the owner on his way in a fairly cheerful frame of mind.

Recently there has been a rather energetic discussion as to who should distribute the parts to be used for service—the maker of these parts or the assembler of the truck. There are various reasons advanced pro and con—but in the main, the chief reason that would appear to be involved has been little mentioned. From a merchandising standpoint there is but one question to be asked—

Who can distribute these parts to the best satisfaction of the vehicle owner?

*Managing Editor, *Motor Age*.

There are some interesting angles to this discussion. Most men of to-day can remember—if they can't, their fathers can—when the stove repair question was a serious one in the household. Stove manufacturers prided themselves on making a stove that was unlike any other stove in every material part. The lids, bolts and what-not of one stove could not be used for another. If you burned out the lid of a stove, and the local merchant had quit handling that particular stove, the family purse had to be drawn upon for the extraordinary expense of sending to the factory for another. Transportation was as poor in those days as in 1920 and perhaps the stove was out of commission for days.

Parts Standardization

Then some one had a bright idea. It was this—the province and business of the stove manufacturer was chiefly to manufacture and sell to the people stoves that would cook the food, keep them warm for the longest time possible. Also to best perform these functions, it was quite necessary that repairs be made as quickly and efficiently as possible. So a good many parts of the stove were standardized. Bolts, plates and other parts became of similar size. The parts business, which had been a source of trouble, was forgotten and "stove parts dealers" appeared in many cities. These men advertise that they have parts for any stove, and usually they have.

The result is that the gossip among people as to the makes of stoves and service has ceased and failures are no longer the cause of people advising their neighbors not to buy a certain stove because they cannot get repair parts. The stove business is more prosperous than ever before.

SERVICE is an important function of selling. Proper service will make new sales easier. Improper service will create sales resistance. Giving satisfaction to the owner constitutes proper service. These are the fundamentals upon which must rest discussions of service and parts handling problems. This article presents a clear analysis of the service situation from the standpoint of the manufacturers' problems.

Just think what would be the result if Mr. Douglas would announce that no pair of Douglas shoes could be repaired unless the leather was bought from his parts department?

Service is, and must be, considered an important function in selling. How many repeat sales will the car manufacturer make if he treats his owners only as a source of profit for parts and repairs? A study of the history of the farm implement business in this regard would be illuminative. The companies that have survived are those which tried to supply service. It has been largely a case of the survival of the fittest.

It is well worth considering how long the manufacturing industry can control the service industry, or whether the manufacturing industry has not created a Frankenstein industry in service. The number of service shops in the United States is estimated all the way from 21,000 to 45,000, according to the definition given of the term "service shop." For the purposes of this article, however, suppose there are 33,000 such shops. The most conservative estimate of the average number of employees in these shops is five. From five the figure ranges upward to seven and even more. Let us put the figure at a compromise and say that there are six in each shop. That seems like rather a small average, when you stop to consider the number of very large shops. With an average of six men to each service shop, we have a total of almost 200,000 men engaged in the servicing of automotive vehicles. As we understand these figures, this does not include the men in the private shops, which would include the shops conducted by a number of large fleet owners, so the number must run even higher. It is to be regretted that there is not at hand a definite statement of the number of men engaged in this particular work.

The Census Bureau in its report on manufacturing activities in 1919 stated that there were 15,486 automobile repair shops and that the value of the products was $2,387,833,000. These figures compare with 3273 shops in 1914, with a product value of $503,230,000. A request to the bureau for a definition of an automobile repair shop brought this reply:

> **"The census of manufactures includes automobile shops only when they use power-driven machinery and partake of the nature of a machine shop. An establishment storing, washing and making minor repairs on a car is not included. The shop must be so equipped as to be capable of manufacturing new parts if necessary or it does not come within the scope of the manufacturing census, which is confined to factories. If a concern stores and sells cars and also maintains a repair department of sufficient importance to come within the census, a segregated report is required and only the statistics for the repair department are included."**

The National Automobile Chamber of Commerce has estimated that there are 300,000 men engaged in the manufacture of automotive vehicles. This estimate, as we take it, is one made when the industry was running at a rather high rate, so according to the present figures the industries are about on par.

The future is vastly different. According to the registration figures, the service man was called upon to handle an increase of 30 vehicles during the year of 1920. There will be another increase in 1921. It is the belief of all those engaged in the automotive industry that the number of vehicles registered from year to year will grow constantly for a good many years. In fact, the only possible limit put upon registration is the introduction of a better vehicle than the automotive vehicle. It is also a fact that the employment in the manufacturing end of the industry will not be as heavy in 1921 as it was in 1920, so it will probably fall below the 300,000 point. During the year it would appear that the service industry is somewhat at least as large as to number of men employed as the manufacturing industry.

A rather unusual question enters here. It seems that vehicle manufacturers want to draw a line through the service business, and the place of this line is not at all well defined. The manufacturers have permitted in recent years certain of the parts makers to establish chains of service shops. Battery and bearing makers are notable examples of the direct service. Vehicle manufacturers, as a rule, have been quite glad to get rid of this part of the service and have advised the owners of their vehicles to patronize the special service plants for these repairs. A man needs be quite expert in definitions to tell on which side of the line service should come.

Present service troubles are largely the result of human weaknesses and a lack of fundamental organization. Often where the organization has been started with good intentions, the human weaknesses have swamped the organization. It is natural for the ma-

MUTT, MITT ME! I'M VICE-PRESIDENT OF A NEW MOTOR CAR COMPANY! WE'RE GONNA TURN OUT THE SAP SIX, THE NIFTIEST CAR YOU EVER LAID EYES ON!
WHY, YOU HAVEN'T ANY MONEY!
THE COUNT OF HOBOKEN IS PUTTING UP THE ROLL! I'M FURNISHING THE BRAINS!
WHAT'S GONNA BE THE PRICE OF YOUR 'SAP SIX'?
THREE HUNDRED AND TEN BUCKS, FULLY EQUIPPED!
YOU POOR FISH, YOU CAN'T BUILD A CAR AND SELL IT FOR SUCH A LOW PRICE AND MAKE A PROFIT!
YES, BUT OUR REPAIR SHOP'S GONNA BE AS BIG AS OUR FACTORY, AND BELIEVE ME IT'LL BE A REGULAR GOLD MINE!
SAP!

(Reprinted from The World)

This cartoon was drawn as a joke—Shall the industry make it a fact?

jority of men to attempt the short road to wealth. Many men think this road is along the route of getting all you can and getting it quick. So many service people have not been able to see that a well conducted, day in and day out business is better than one where you charge all that the traffic will bear and do just as little as possible.

This theory has been the mainstay of the maker of unreliable parts. He is able to turn out a part that will serve for the time being. Neither he nor the service man to whom he sells is much concerned as to how long it will last. Perhaps the service man may have a good enough idea of business to want to do a good job, but a smooth salesman from the unreliable parts maker has convinced him that this cheaper part will do the work just as well. Perhaps the sample was good, but the question is as to the run of the factory. A service man may be honest and still not have the facilities for judging the parts shipped to him. If he has not these facilities he must deal only with reliable firms. Some independent parts manufacturers have established themselves as makers of reliable parts and frequently they supply parts of slightly different design or material from the original that supply a choice in making changes or repairs in the vehicles. It can be said, in truth, that some car makers have at times been entirely unable to supply parts for their own cars and these cars have been kept on the road by independent parts makers and no objection has been found to the parts.

An engine maker not long ago received a complaint from a service man (who enjoys an excellent reputation) that a lot of bearings he had bought were not giving proper performance. The engine maker had the bearings shipped to his factory. The factory men saw at once that these bearings had never been in their stock and it later developed that they had been shipped to the service man by the truck assembler. The assembler bought them (apparently in good faith) thinking they were entirely satisfactory.

A long time is required to build up an industry of the size of the automotive service industry to the point where it will function with reasonable certainty. A new industry always attracts adventurers and promoters. There was a time when the service industry was made up almost wholly of this type of men. Fortunately this day has gone. The personnel of the service shops to-day is of a much higher grade than a few years ago. There are many men in the service business who see in it an opportunity for a just and fair business. They look to the future confidently and their hope is to establish a business that can be handed from father to son. The same can be said of manufacturers of independent parts.

It is on such men as these that the future of the service business depends. There is, unfortunately for quick action, much in this new industry that depends upon co-operation with factories and with engineering. Where these men are directly connected with factories they get co-operation, but in the main they do not get co-operation unless they are "authorized," and in most cases that means connected with the selling of the vehicle.

One of the great needs of the service industry to-day is the elimination of secrecy and mystery. In some cases this secrecy and mystery has been due to manufacturing imperfections. As time goes on, there will be less of this in the factories, and the service man will get a better understanding of the product on which he is working.

The importance of service is coming to be recognized to an increasing extent in design work. The car and truck designer in many plants consults intimately with the factory service manager in working out new models. In certain instances, factory service managers have worked out methods of keeping in touch with owners and service stations, so that future designs can have immediate benefit from service experience.

The service factor is entering into design, also, because it is recognized that a larger percentage of buyers every year are replacement buyers. The man who owns a car for the first time may not consider seriously the service phase of car ownership, but the man who is buying his second or third car will look into that phase carefully. The manufacturer is responsible for keeping the owner satisfied. When the service organization functions efficiently, service becomes a real help to future sales.

The manufacturer is often in a position to investigate methods and equipment in a way not possible for the individual service station. Some manufacturers, for example, have gone so far as to test out and investigate service station machinery and to recommend certain types of tools for use in their service stations.

Standardization is making for great progress in the service industry. It will go even further. To-day qualities of drop forgings and similar articles that go into practically all cars are carried by supply houses, such as hardware supply stores.

More and more men each year are gaining an understanding of the new transportation vehicle, for it is new despite the seeming public familiarity with it. The changes in manufacture have been rapid. No one man could keep all of these changes in mind. The mechanic who is a competent worker on one make of car is better equipped to work on all cars than was the man with so restricted an experience a few years ago.

Service is not hopeless, by any means. It needs more time, more patience and more conscientious effort and less selfishness.

New Duesenberg Reflects Experience Gained with Racing Cars

Striking engineering features characterize the latest product. An eight-in-line engine, four-wheel brakes, overhead camshaft, and tubular connecting rods are included in design. High pressure oiling is employed. Drive shaft and front axle are tubular. Semi-elliptic springs used.

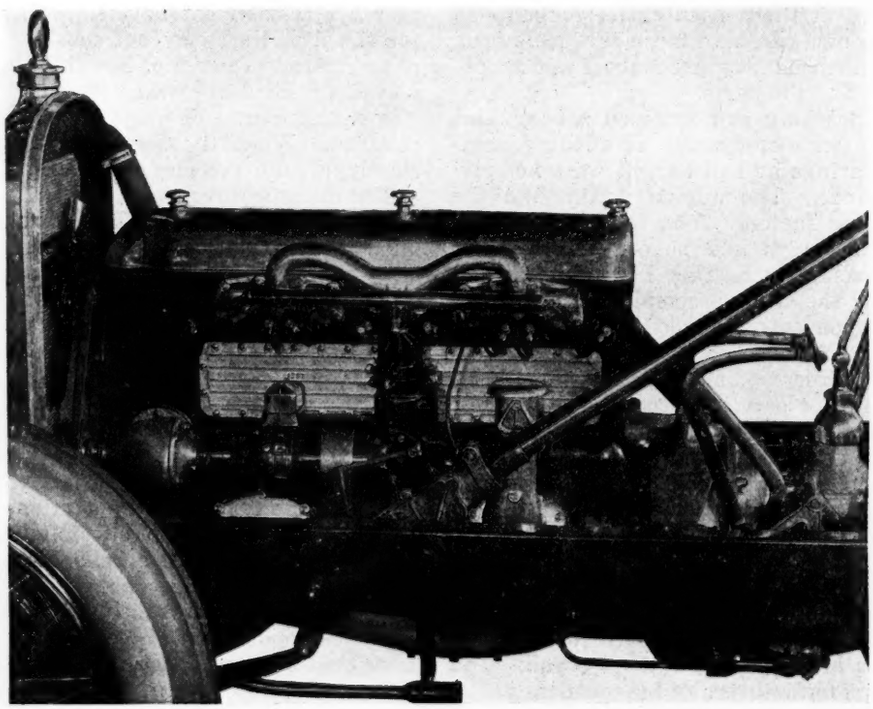
By J. Edward Schipper

INCORPORATING such features as an eight-in-line engine, hydraulically operated four-wheel brakes, overhead camshaft, tubular connecting rods and a weight of only 3200 lb. in spite of a wheelbase length of 134 in., the new Duesenberg presents some very interesting engineering features. This car is one of the most direct interpretations of racing experience which has ever been offered the public. Its engine is identical in many respects with the 183 cu. in. engine of the Duesenberg racer which recently won the French Grand Prix race. With a bore of 2⅞ in. and a stroke of 5 in., it has a displacement of 260 cu. in. and develops from 90 to 100 hp. An output of 1 hp. per 2.6 cu. in. of piston displacement with a compression of 80 lb. per square inch gage gives a good idea of the characteristics of the engine. The upper half of the crankcase and the cylinder block containing the eight barrels are cast as a unit. The cylinder head is removable and incorporates the overhead camshaft and rocker arms. The valve and spring mechanism are inclosed by a detachable cover plate and the lower half of the crankcase and the oil pan are a unit aluminum casting, removable while the engine is in the frame.

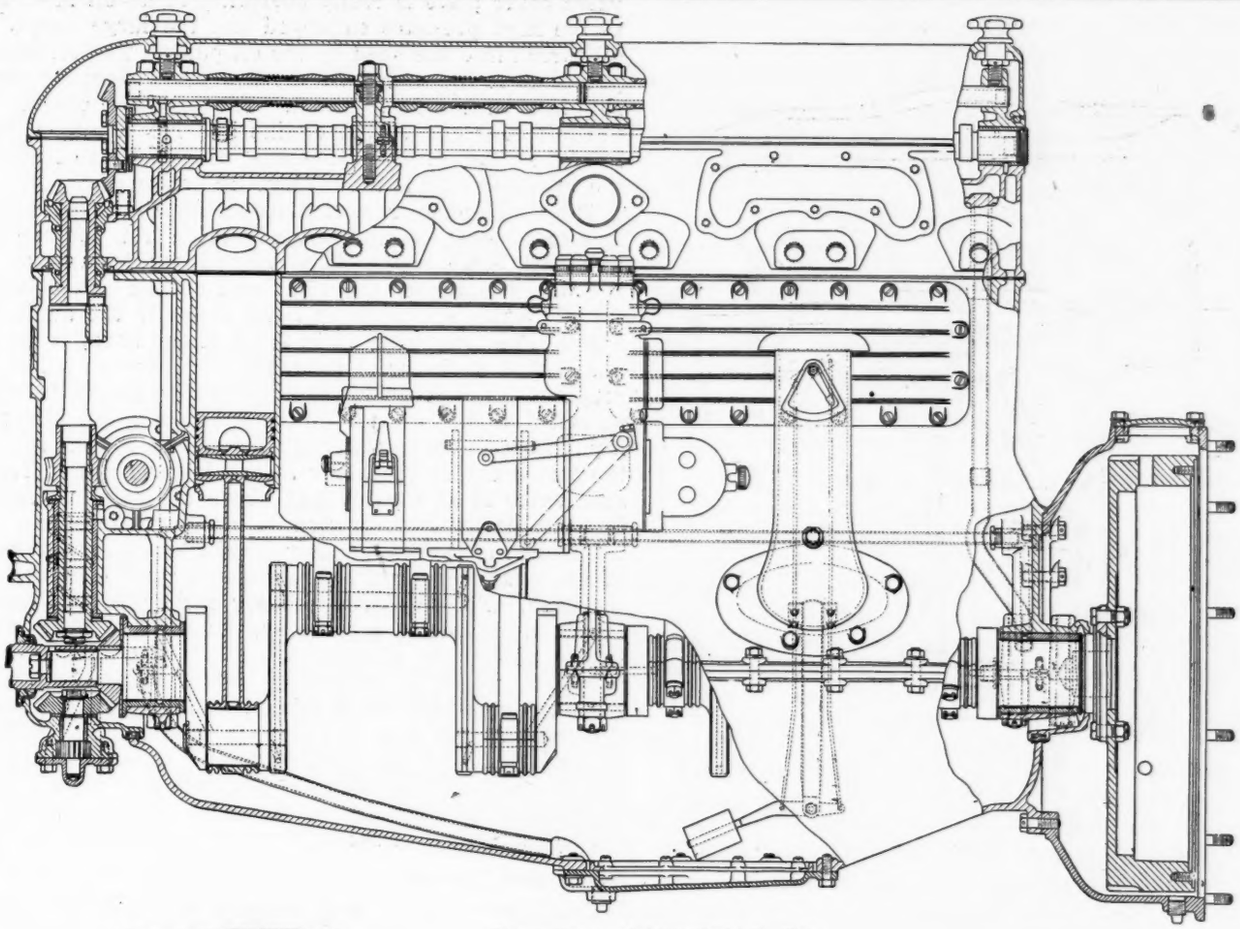
The pistons are magnalite, although cast iron will be supplied if desired. They are of flat-top design, 3⅛ in. in length, with three ⅛-in. rings. The tubular connecting rods are 9¾ in. in length, machined all over and equipped with annular cooling ribs at the lower end. The piston pin is held in the upper end of the connecting rod by a lock screw, the bearing being held in the piston.

Three main bearings support the one-piece crankshaft. The crankshaft diameter is 2⅜ in. at all main bearings, and the bearing lengths are 2½, 2½ and 3 in., front, center and rear. The lower connecting rod bearings are all 2 in. by 1⅞ in. It has been found that the use of a smaller diameter at the end of the throw than at the main bearing is a material factor in assisting balance of the crankshaft. Spiral bevel gears and a vertical shaft are used for driving the one-piece, hollow camshaft which is mounted on five bearings. There are two valves per cylinder, each actuated by a forged alloy steel rocker arm, and two concentric springs. The valves open downward directly into the spherical combustion chamber, which is polished to prevent carbon collection. The vertical drive shaft is made in two pieces so that the head can be removed and replaced without changing the valve timing, the driving lug on the vertical shaft being offset so that the head can be replaced in only one way.

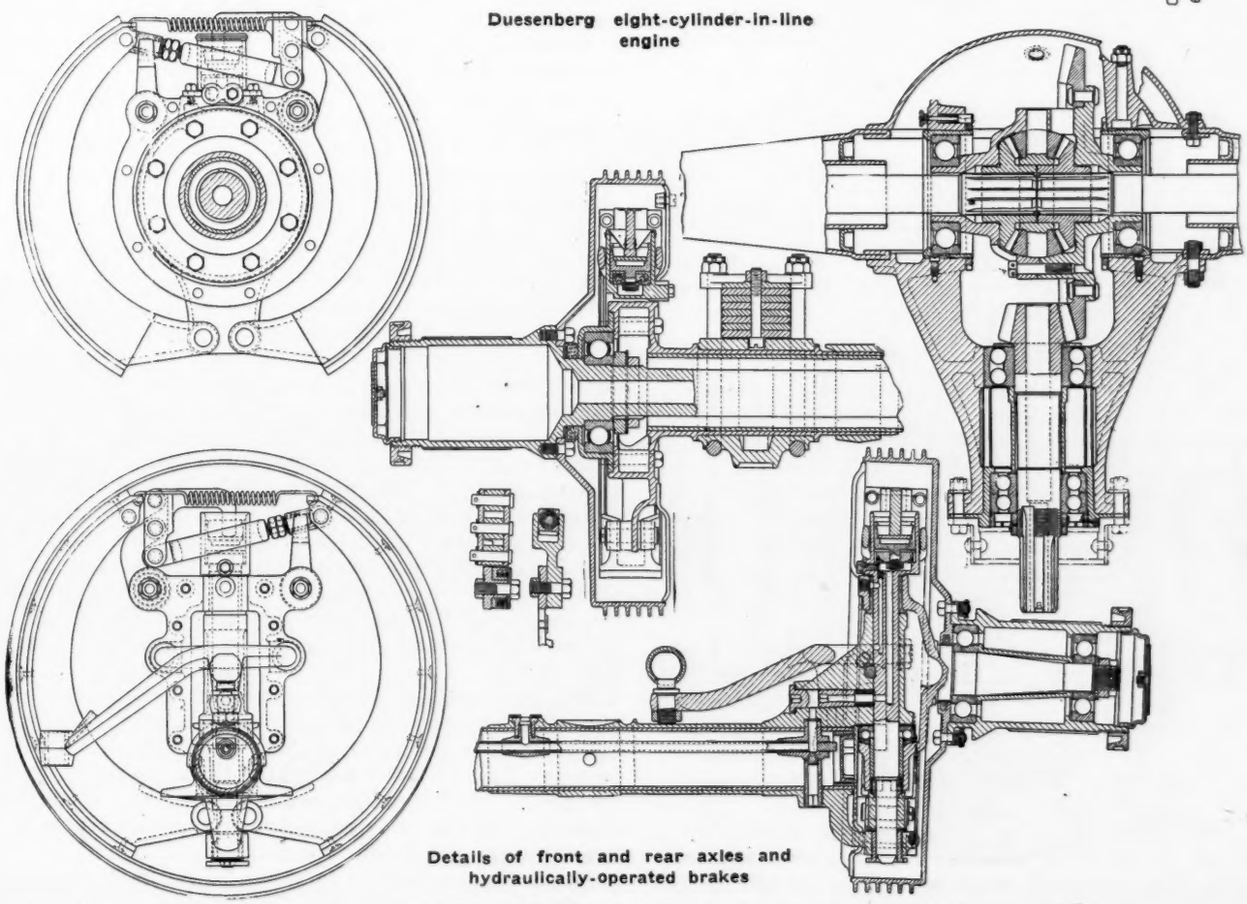
High-pressure oiling is employed, the oil pump being driven directly from the crankshaft. This is a gear pump capable of delivering a maximum pressure of 250 lb. per square inch. The oil is led through the drilled crankshaft to all of the main bearings under pressure and also to the hollow camshaft and hollow rocker arm shaft. The pressure feed, therefore, is directly to the camshaft bearings and also to the rockershaft bearings, from which the oil feeds to the valve driving contact points. The mechanism underneath the



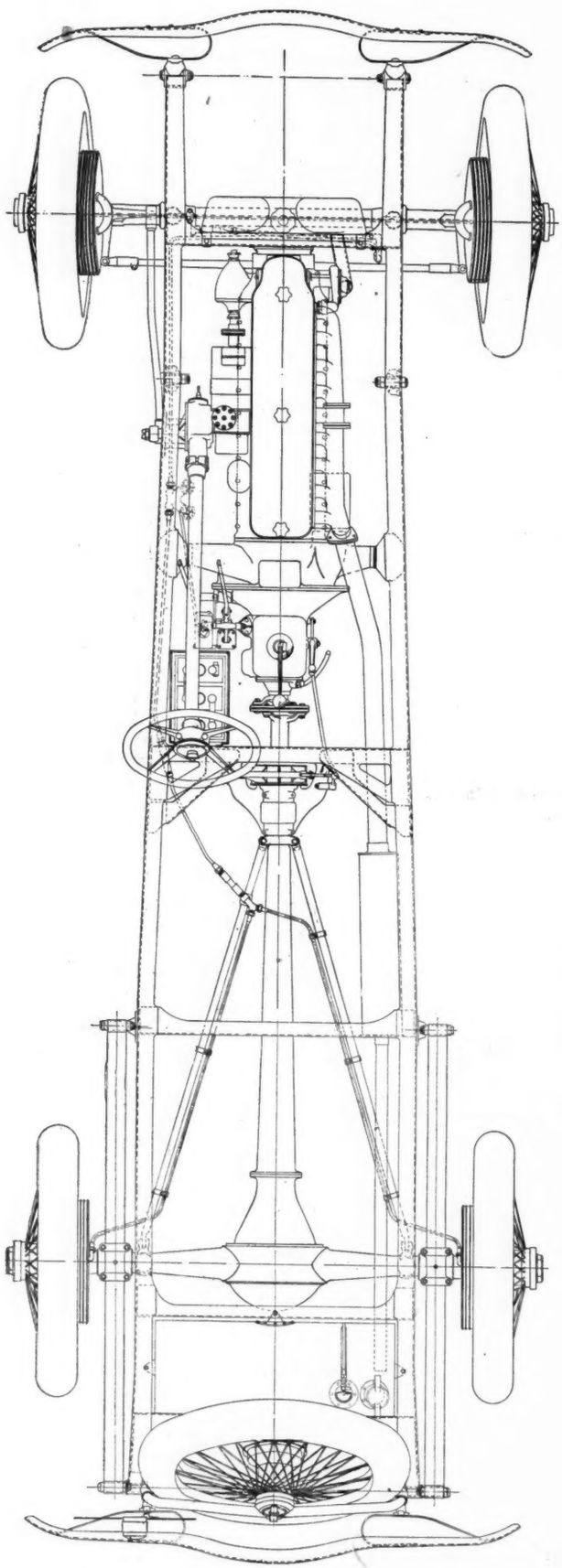
Forward part of Duesenberg eight-in-line chassis



Duesenberg eight-cylinder-in-line engine



Details of front and rear axles and hydraulically-operated brakes



Plan view of chassis

valve cover plate is really operating in an oil mist, due to the high pressure employed and the large supply of oil forced into the head by the oil pump. The oil return passes over the camshaft driving gears, keeping these supplied with a bath of oil. The breather pipe is on the left rear end of the engine and has a hinged cap. It acts as the oil filling passage, and upon the front of the breather pipe is the oil level indicator gage.

The water pump is a centrifugal impeller type driven by a cross-shaft which receives its drive from the vertical camshaft drive shaft. The cross-shaft terminates at the water pump on the right and on the left delivers the drive through a set of bevel gears to the auxiliary shaft. The fan pulley is in front of the bevel gearcase and behind it the drive is transmitted through a flexible coupling to the generator and distributor, the latter being mounted on the rear end of the generator. An interesting feature in connection with the cooling system is that the water enters the block at the lower right in front and leaves it at a point just above the point of entry. The circulation is controlled by internal baffles.

Gasoline is fed from a 20-gal. tank located at the rear of the chassis to a Stewart vacuum tank mounted on the dash. The 1½-in. Stromberg carbureter is located on the right side of the engine, the gas flow being vertically upward to a hot-spot contact with the exhaust manifold, which is located on this side of the block. From this point the gas is taken through a straight passage between the two center cylinders across the block to the left side of the engine, where it enters the aluminum intake manifold, which is of ramshorn design. This distribution system for the gases is clearly shown in the left-side view of the engine herewith.

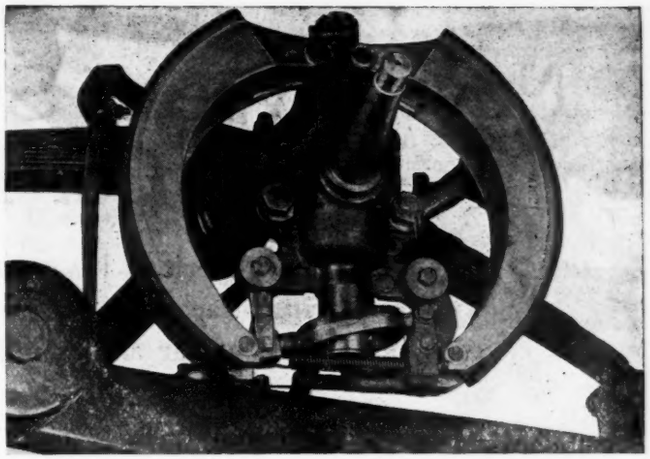
Suspension System

The flywheel is a steel forging, machined all over, with the starting gears cut in the periphery. The clutch is housed in the flywheel, which latter is inclosed in a bell housing which carries the side arms for two points of the engine suspension system. The third point of suspension is at the front end, where there is a patented trunnion, giving a three-point flexible mounting. The clutch is a single dry plate type and the gearset a three-speed unit, providing ratios in the gearbox of 4.016 to 1 on reverse, 3.167 to 1 on first, and 1.1654 to 1 on second. The rear axle ratio is 4.6 to 1. The drive to the rear axle is through a double flexible joint and a tubular drive shaft, which is inclosed in a torque tube. The thrust of propulsion is also taken on this torque tube, which carries a yoke at its forward end hinged to the center cross-member of the frame. In addition, there are two radius rods which run from the extremities of the rear axle to the front end of the torque tube. The rear axle housing is of molybdenum steel, in one piece, and reinforced. The pinion shaft is mounted on two double-row annular ball bearings. The differential consists of a forged steel case inclosing the spider arm, four bevel gears and two side gears splined for the axle shaft. The hollow axle shaft is of molybdenum steel, the shaft and hub being in one piece. The wheels are Rudge-Whitworth design and are mounted on annular ball bearings.

The front axle is also tubular and the axle ends and steering knuckles are of molybdenum steel. The front axle, which is shown in section herewith, is claimed to be more than 25 per cent lighter than the usual type of front axle and at the same time more than 25 per cent stronger. The axle is so designed as to incorporate the passages for the brake operating fluid.

The brake drums are forgings 16 in. in diameter and are fitted to all four wheels. In order to obtain a perfect

braking surface the drums are ground. Circumferential fins are machined on the outer edges to provide strength with lightness and radiating surface. The four brakes are operated by hydraulic pressure. A master cylinder is connected to the brake pedal and the liquid is forced through the lines running to the four wheels by a piston in the master cylinder. A small cylinder in each of the four brakes has a piston which is forced upward by the liquid entering the cylinder. The piston at the brakes operates a toggle arm which, in turn, expands the two brake shoes in each brake. All four of these brakes are operated simultaneously by the service brake pedal. An interesting feature of the brakes is the fact that, owing to the floating arrangement of the piston and toggle, the brakes are self-centering and, consequently, self-equalizing. Once the brakes are applied, they provide equal pressure against each drum. Water is used as the brake-operating fluid in summer time and an anti-freeze solution in winter.



Hydraulically-operated front wheel brake

Four-Wheel Brakes

In a demonstration given the writer in one of these cars on the roads around Indianapolis, the braking power of four-wheel brakes was thoroughly demonstrated. On roads which corresponded in surface to the ordinary gravel roads, the car was stopped in approximately its own length from a speed of 30 m.p.h. There was no skidding tendency whatever, and one of the points demonstrated was the ability of the driver to maintain a high average speed on a winding road, because of the quickness with which it is possible to slow down on coming into a curve. An interesting point brought out was the fact that during the time all four brakes are applied the car loses much of its responsiveness to the steering wheel because of the tendency to go into a front-wheel skid with the front-wheel brakes applied. A driver soon becomes educated, however, to releasing the brakes on manipulating the steering wheel. The hand brake operates on a drum at the forward end of the propeller shaft.

The car is mounted on semi-elliptic springs, the front being 2¼ in. wide by 40 in. long and the rear 2½ in. wide by 59 in. long. The springs are equipped with Watson "stabilators." Chrome nickel steel is the frame material, the channels being 6-7/16 in. in depth by 2⅛ in. in width. There are five cross-members. The car has a clearance of 11½ in. under the front axle and 10 in. beneath the engine. The rear axle clearance is 10½ in. The bodies are of aluminum with steel fenders, and the equipment includes bumpers and a spare wheel carried at the rear of the car with a three-point mounting. The tires are 33 by 5 in. all-around. Chassis lubrication is by the Alemite system. The price of the car will be between $6,000 and $7,000.

A Constant Compression Engine Cycle

ONE of the chief disadvantages of the conventional throttling four-stroke cycle engine is the fact that its economy falls off rapidly as it is throttled for part-load operation. At light loads the fuel consumption per b. hp. is sometimes three or four times that at full load, yet the average passenger car engine operates most of the time at less than one-third load. Various attempts have been made from time to time to overcome this disadvantage by the use of some constant compression type; that is, an engine in which the compression pressure remains constant regardless of the load. In such an engine it is customary to localize, at least to some extent, preferably in the vicinity of the spark plug, that portion of the charge containing the fuel and to admit through another valve sufficient air to fill the remainder of the cylinder, thus preventing the formation of a mixture too lean to burn.

Patents covering a "cycle" or method of operation of this character have been granted to W. L. Dempsey. In this case a third valve of the automatic type is applied to an engine of conventional four-stroke type. The third valve is located near the base of the cylinder, so that the port to which it is connected is uncovered by the piston at the end of the suction and power strokes. The valve does not open, however, unless the pressure in the cylinder is below atmospheric. It admits only pure air, which, it is assumed, does not mix intimately with the remainder of the charge, but forms a strata next to the piston. The quantity of air taken in is dependent in part upon the extent to which the engine is throttled, the greater the depression in the cylinder the greater the quantity of air drawn through the automatic valve and the greater the proportion of pure air in the total charge. The carbureter is set to give an over-rich mixture, which is taken in through the main inlet valve, but the air taken in later is sufficient to dilute the total mixture so that it is of correct proportions for complete combustion, or on the lean side.

Considerable increase in economy and other advantages are said to result from the application of small automatic valves to existing automobile engines, but authoritative data in this regard has not been furnished, nor, so far as we are informed, has an engine designed with particular reference to operation on the so-called "Dempsey cycle" been constructed to date.

AN improvement in spring drives for electric starters has been patented to S. W. Rushmore. It consists in making the helical spring used with such drives of tapering section, so that it may be comparatively light or flexible when first beginning to wind up and become sufficiently stiff before the engine is broken loose to prevent abutting of the starter pinion against its stop. It is claimed that when the spring is made of uniform thickness throughout, in order to get sufficient flexibility, the spring is sometimes made so light that it cannot withstand the shock of abutment and breaks.

Novel Type of Suspension Interests British Car Manufacturers

It is said to have merit of low cost as well as to improve riding qualities. Two-leaf spring attached at two points to chassis frame by rubber blocks runs full length of car and is bolted fast to both front and rear axles.

By M. W. Bourdon

A PROMISING new spring suspension system has recently been introduced in England by the Cowey Engineering Co. About a score of British motor car manufacturers are now either testing it on cars of their own make adapted to utilize it or are going carefully into its possibilities. Eight experimental cars have already been fitted up with the system, and one prominent maker has definitely decided to adopt it for his cars which will be produced when his present batch is completed—say about the middle of next year.

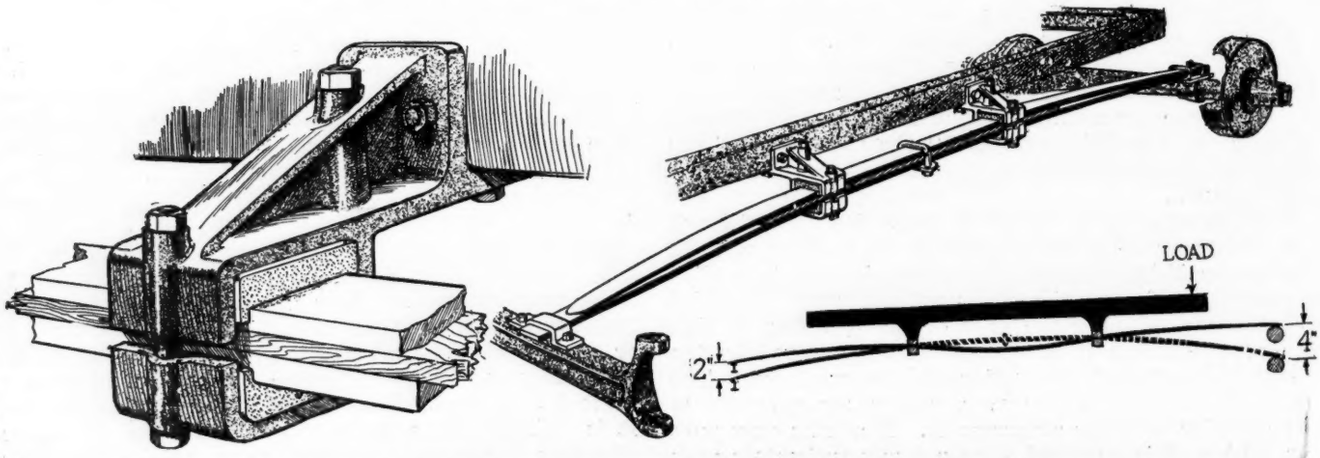
The system is simplicity itself and no lengthy explanation is needed to supplement the accompanying drawings. There are two inverted half-elliptic springs, one at each side of the chassis and running without break from the front to the back axles. Each unit consists of two leaves only with, in the case of cars of 15-hp. and over, a wood strip between them over approximately half their length. Each spring is connected to the chassis by two brackets, but is not held rigidly in them, rubber blocks being interposed above and below. Between the brackets a clip encircles each spring, and serves as a means of adjusting the frictional effect between the leaves and the wood strip. The latter is provided to increase the frictional effect, on medium sized and large cars, along that portion of each spring where it has been found desirable to do so, or that is between the frame brackets. Both leaves of each spring are rigidly attached to the rear axle, but one only, the lower, is secured to the front axle, the upper leaf being either cut off 2 or 3 in. short or allowed, if of full length, freedom to move longitudinally over the other.

There are several advantages derivable from this system of suspension. In the first place, it has the low cost of quarter elliptics front and back without the drawback of imposing localized stresses of considerable magnitude on the side members of the frame where the brackets occur. Then, it has no details requiring lubrication, which obviously means a lower cost as compared with systems requiring greasers, oilers and oil-less bushes, and is a feature which cannot fail to appeal to users by simplifying maintenance.

But where the chief advantage of the system lies is in its behavior on the road. Dimensioned and arranged to suit the individual car, it can have an unusual degree of flexibility without giving rise to a tendency for the car to roll or bounce. It can have a very low period and in some cases this is as low as 55 per min. without drawback in other directions. Further, fore and aft plunging is almost entirely eliminated on roads which encourage that action with ordinary suspensions.

The merit last referred to is due to the "sympathetic" deflection of the opposite end of each spring from that which receives the initial shock. When, for instance, the back axle is lifted relative to the frame by a bump on the road surface the front end of the spring is also affected, a fact which is demonstrated by loading up the back of the car, which has the effect of deflecting the front end to an extent equalling approximately 50 per cent of the deflection at the rear. The accompanying diagram illustrates this point and shows the peculiar curvature which the spring assumes as a result of initial deflection occurring at one end.

The purpose of allowing the springs to float within rubber blocks in the brackets and of securing the top leaf rigidly at the rear end only is, of course, to allow the



The Cowey spring suspension, showing method of attachment to chassis frame and axles. The diagram shows the curvature assumed (heavy line) when one end is deflected 4 in. The other end of the spring is then said to have a "sympathetic" deflection of 2 in.

top blade to move over the other when the spring is deflected at either end. It will be realized that this latter necessitates that the top leaf shall be free to move longitudinally to a limited extent within the brackets and that the lower one shall be able to "roll" within them when its curvature is varied, for the brackets are rigidly bolted to the frame and have no trunnion bearing. Both these movements are permitted by the rubber blocks, but the latter do not vary their position relative to either the blades or the brackets; there is merely a movement within the body of the rubber. When an experimental suspension has been dismantled after being in use for several months, the rubbers have been found firmly adhering to the metal above and below them and have shown no signs of wear. For this reason the rear ends of the springs are able to take both torque and drive, for the thrust from the latter does not, as might be expected, cause the springs to be pushed bodily forward in their brackets.

The absence of rolling with this suspension is ascribed to the thickness of the individual leaves of the springs, which it is maintained exert greater resistance to torsional stresses such as exist when rolling tends to occur. As an indication of the dimensions of the blades, it may be said that on a heavy car, one weighing say 4000 lb. unladen, each blade is 2½ in. wide and 1 in. thick.

The Cowey system is being tried out by makers of British cars of almost all sizes, from a 10-hp. two-seated runabout to a seven-passenger car of 30-hp.

A New Gear for Motor Truck Axles

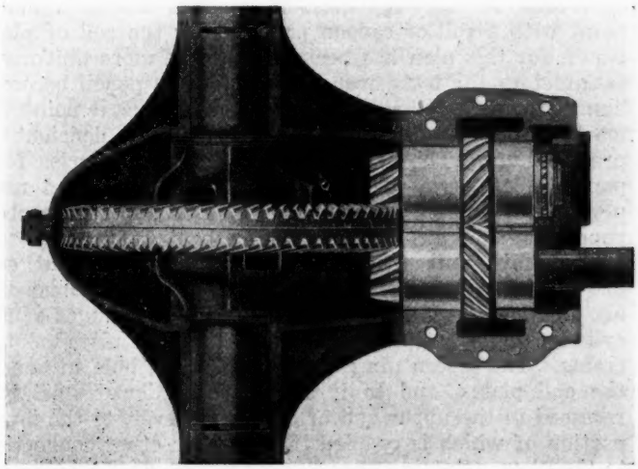
A RECENT development is a double helical bevel gear for motor truck axles. The outstanding feature of this gearing is the double strength which is claimed to allow the use of very small bevel pinions so that it can give sufficient reduction and still have sufficient strength and road clearance for motor trucks, where it has heretofore been impossible to use bevel gears, and manufacturers have had to resort to the worm or double reduction gearing.

The inventors claim that two 8-tooth, 5-pitch bevel pinions are strong enough for use with a 4-by-5, four-cylinder motor and standard transmission, giving an 8½-to-1 reduction with 13.6-in. ring gears, thus allowing 10½-in. road clearance with a 2-ton truck fitted with 36-in. drive wheels. An axle for a 1-ton truck with a 3¾-to-1 reduction utilizes 10¼-in. ring gears with an 8-tooth, 5½-pitch pinion.

Another advantage claimed by Penrod and Wissel of Cincinnati, the designers, is a complete herringbone balance of all gear thrusts caused by the helical angle of all gears and also complete balance of the separation thrusts on the ring gears, allowing the use of cheaper bearings, a lighter case with at least as high efficiency as where only one set of helical bevels are used.

The two ring gears and bevel pinions are interchangeable and the two spur gears are equal but of opposite inclination of the teeth. For trucks it is cheaper to make two helical bevel ring gears than one of the same strength, as the two and the elimination of gear thrusts allow the use of much cheaper bearings and case. It is claimed that the loss of power and extra wear from going through one more gear than the single-bevel axle is more than compensated for by the elimination of gear thrusts and the consequent lessened strain on case bearings.

Regarding adjustment of this axle, the inventors state that it is entirely unnecessary after it is correctly assembled, as it will remain in adjustment, due to the balance of all gear thrusts. The ring gears may be ground to the correct thickness after they are heat-treated and hardened.



Installation of Penrod double spiral bevel gear for rear axle reduction

Depreciation and Its Relation to Cost

AN interesting paper on "Depreciation—Its Relation to Costs and Financial Statements," was read recently by C. A. Porter, comptroller of the Hardinge Company, at a meeting of the New York section of the Industrial Cost Association.

There are four main factors, Mr. Porter said, to be taken into consideration in making up depreciation schedules—length of life, cost of repairs, obsolescence and inefficiency. A perpetual inventory of the physical assets of any plant was recommended. This record, commonly called a plant register, should contain an individual sheet for each building, each machine and each major piece of equipment. Small tools should be listed on one sheet for each department.

This plant register should show, among other things, the date a machine was installed, location, description, builder, original cost, cost of installation, total cost, anticipated life, rate of depreciation, depreciation to date and the disposition, if any.

While Mr. Porter's paper was interesting and practical from many standpoints, the question of obsolescence, which is most important to the automobile manufacturer, was not thoroughly gone into. A discussion of the subject, following the paper, brought no tangible solution to this perplexing problem. Several members of the association pointed out that too great an allowance for obsolescence could not be made in writing off depreciation because the Government would not permit it in income tax returns. Others contended, however, that if a body of manufacturers agreed that a certain tool or machine was likely to become obsolete, or superseded by a newer and better machine within a few years, the Government officials were tolerably lenient in this respect and would allow the factor of obsolescence to appear in the depreciation items.

A New British Traction Dynamometer

A description of a recording instrument designed especially for use in tractor trials, registers drawbar pull, time, and distance covered. It requires little attention from observer over several hours' operation.

A NEW draw-bar dynamometer outfit designed by G. W. Watson, engineer to the organizers of the British Tractor Trials, was demonstrated in practical use at the recent trials near Shrewsbury, England. Eight instruments were in constant use for several days, every competing tractor having one interposed in its coupling to the plow for six consecutive hours.

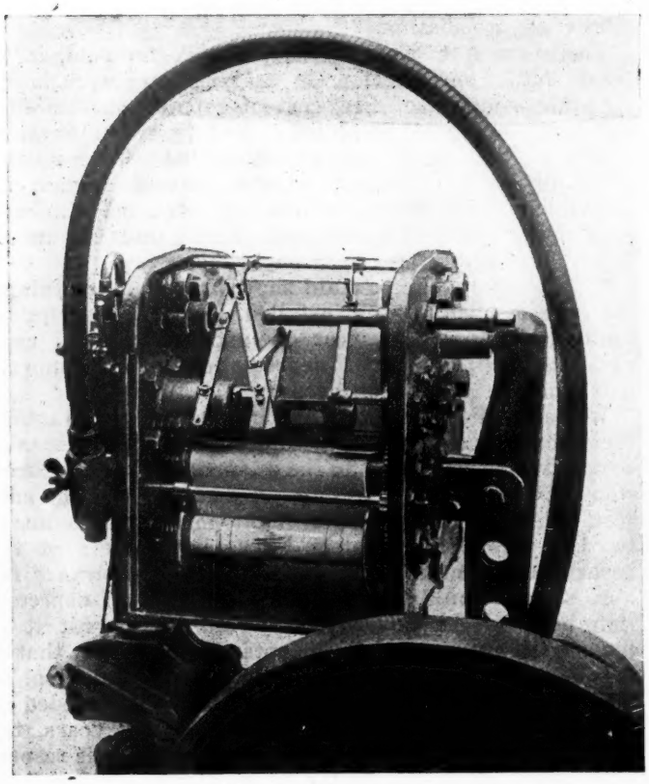
The complete testing outfit consists of three units:

(1) The draw-bar dynamometer unit, which is intended to be coupled in series between the tractor and plow, etc.

(2) A small case carried on the tractor containing a dry-battery and clock mechanism provided with electric contacts, and

(3) A depth measuring attachment, which is intended to be secured to the frame of the plow, cultivator or other implement.

It is claimed that neither the main unit nor any detail of the outfit is a laboratory instrument, but that the whole outfit is a commercial testing apparatus of robust construction, and calculated to stand the severe conditions of service in the field or on the road in the hands of semi-skilled attendants. Previous units of this kind which have been supplied by the National Physical Laboratory, Teddington, England, for use at British tractor trials have, on the other hand, required careful handling and skilled attendants and necessitated the latter being constantly at hand. Nor have they been composite units, the recording apparatus being carried by one of the men in charge walking alongside the plow coupling.



Close up view of main unit of Watson recording dynamometer showing three stylus levers and other details

The Watson dynamometer unit can be coupled up to the tractor and time clock, loaded with a roll of paper, and left to its own resources during six hours' continuous plowing at an average speed of 2½ m.p.h., the limitation of time being merely concerned with the length of the roll of paper carried.

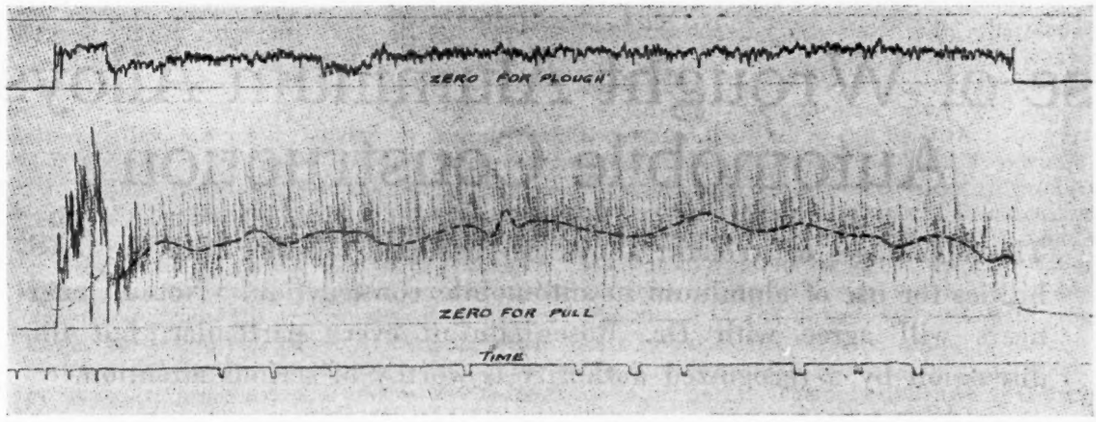
The main unit is mounted on a tubular T-shaped frame and runs on two cast iron wheels, one, of considerably larger diameter than the other, serves to rotate the paper rolls by means of bevel gearing and a flexible shaft.

The base and end plates of the recording instrument are carried by a pivot post attached to the single member of the tubular frame in such a manner as to allow the axle to swing sideways or vertically and to accommodate itself to inequalities of ground surface. Part of the weight is supported by a pair of leaf springs acting as shock absorbers and keeping the wheels in contact with the ground, while the pivot post end is connected to the tractor draw-bar by means of a semi-rigid coupling so that approximately half of the weight is actually carried on the draw-bar, but as the whole outfit weighs only 60 lbs., this is not a serious matter. The rear end of the draw-bar unit can be connected by chains, etc., to the implement which is being hauled.

Applying to the paper roll are three stylus points, the central one indicating the draw-bar pull, another the elapsed time by diversions from the straight line at intervals of half a minute, and the third the plowing depth. The time stylus is controlled by the time clock already referred to, while the depth recorder is actuated by the movement relative to the plow frame of a small castor wheel running on the unplowed land and carried by means of a bracket and hinged fork attached to the plow frame.

Of the various methods by which the stylus can be made to record, it has been decided to make use of a metal point with a roll of carbon paper under the roll of plain paper, for this plan has been found to be more uniformly satisfactory for tests over long periods; a pencil becomes blunt, an inking pen may dry up and a metal point for marking on metallic paper has also proved deficient in practical use. The draw-bar unit therefore carries four paper rollers, two of these being for unused and used plain paper and the other two for unused and used carbon paper.

The main unit frame is built up of two stout end plates and a base plate, supporting between them the main hydraulic cylinder and piston, the end flanges of the cylinder being securely bolted to the end plate of the frame. The piston pin projects through a hole in one of the end plates, and to it applies a hardened steel ball recessed in the upper end of a rocking lever, to the lower portion of which is coupled the chain or other connection to the plow. But in order to ensure that no distortion of the dynamometer frame shall occur in use, this rocking lever is pivoted to the rearwardly extending ends of two



Sample of record from Watson dynamometer. Perforations not visible indicate distance covered

tension links, which pass with clearance through the frame at both ends and are secured at the front to the pivot post of the instrument. But for this arrangement the whole of the frame work of the recording apparatus would have to be made far more substantial, and would then possess a great disadvantage in excessive weight. The lower portion of the ball-ended lever is provided for two holes, the lower one being intended for use when coupling up to implements with a draw-bar resistance up to 3,000 lbs., and the upper one for draw-bar effort up to 6,000 lbs. When a pull is applied to the lower end of the lever, the ball at its upper end presses on the exposed end of the hydraulic piston, but the maximum pressure at any time created by the loads mentioned does not exceed 500 lbs. per sq. in.

The main hydraulic cylinder is connected to a smaller cylinder and piston, the latter operating the stylus in the same way as a steam-engine indicator. The total range of this smaller piston is only ⅜ in., but by means of multiplying levers, the stylus point has a range of 3 inches on the chart, and by a special system of linkage the actual movement of the stylus point in either direction is practically a straight line. The indicating piston is forced out of its cylinder against the resistance of a calibrated spring, which yields in direct proportion to the pressure created in the main cylinder. By thus limiting the movement of the small piston and spring to ⅜ in., the inertia effect becomes practically negligible. Positive stops are provided for the indicator piston, so that the stylus levers never carry any portion of the load.

The rate of paper feed is determined by passing it half round a feed roller with pin projections, this roller being driven by the flexible shaft and gearing from the measuring wheel which bears on the ground. The feed of the paper is therefore directly proportionate to the travel of the dynamometer and is approximately 1⅜ in. per 100 ft. of travel. The pin projections in the feed roller perforate the paper and are so spaced that the distance between any two perforations represents 25 feet of travel. The rollers which receive the chart and the used carbon paper are friction driven from the feed roller, so that, as the diameter of these rollers increases with the amount of paper rolled on them, slip can take place and damage to the chart is avoided.

The time indicating stylus normally inscribes a continuous straight line, but at each half minute a kink is made in the line by the stylus being moved laterally by an electro magnet.

With regard to the depth indicator mechanism, the fork which carries the small castor wheel running on the unplowed land is actually a bell-crank lever, and once the vertical position of the pivot of this bell-crank lever has been adjusted to suit the plow, it remains constant throughout the test. As the plow shears and the frame to which they are attached sink in proportion to the depth of plowing, proportionate movement is given to the bell-crank lever, the short end of which exerts a pull on a Bowden wire coupling with the recording instrument, and thus allows the lighter of two springs to force the stylus lever sideways to indicate the depth of furrow. When the depth of plowing decreases the stronger spring is more or less released; it therefore compresses the light one and forces the stylus lever back towards zero.

It will be noted from the foregoing that the depth recorder indicates the average depth of the two or more furrows being plowed and not the depth of individual furrows, but obviously the latter is not required to be known in taking a record of the total work done by the tractor. The records produced by the instrument can be easily integrated to obtain average pulls and depths, and from the markings of time and distance the speed can be plotted.

Every moving portion of the outfit is completely enclosed, with provision for adequate lubrication, and a dust cover with transparent sides is provided to encase the paper rollers and stylus pins.

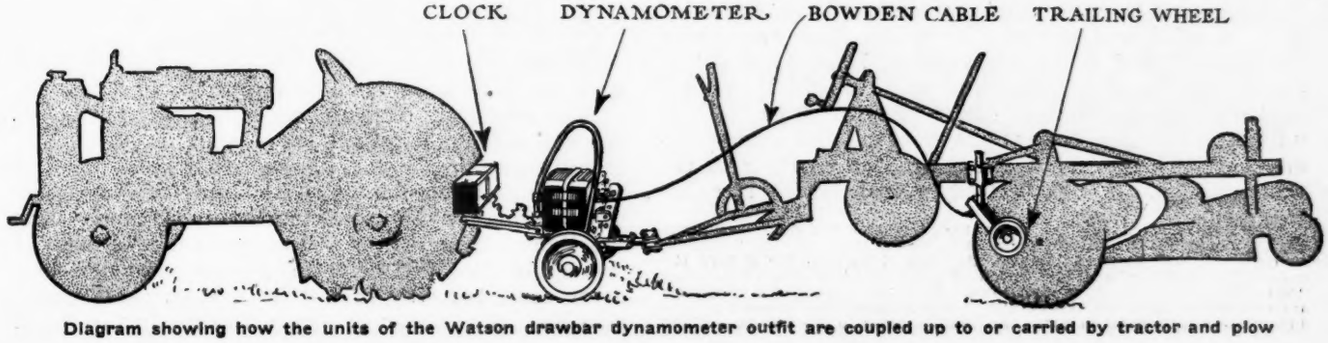


Diagram showing how the units of the Watson drawbar dynamometer outfit are coupled up to or carried by tractor and plow

Use of Wrought Aluminum Alloys in Automobile Construction

The advantages of wrought alloys are discussed together with the possibilities for use of aluminum in automobile construction. Not all engineers will agree with Dr. Rosenhain in every particular, but this discussion by a recognized authority is worthy of serious attention.

By Dr. Walter Rosenhain, F.R.S.

WHILE it is undoubtedly the function of the designing engineer to select the materials which are to be employed in the construction of his machines, he is yet dependent upon the metallurgist for those materials and, in the first instance, for his knowledge of their properties. Particularly is this true where materials of a more or less novel kind are concerned. Therefore, the metallurgist who is well acquainted with them is in a position to offer suggestions which may prove of value to the designer. It is in this spirit that the question of the utilization of aluminum alloys in automobile construction is treated in this article.

Light alloys of aluminum are, of course, already used to a very considerable extent in various ways in existing automobiles and an attempt has been made to produce an "all aluminum" car. Yet in the majority of designs steel predominates and light alloys are only used for special purposes, such as the aluminum piston which has been discussed in considerable detail, and for more or less subsidiary castings, such as crankcases, gear-boxes, etc. In the latter cases the principal, if not the sole, reason for employing aluminum alloys is the desire to save weight. Indeed, apart from the pistons and cylinders, where thermal conductivity enters so largely into the problem, the saving of weight is the main advantage to be gained by the use of aluminum. The principal question is, how far this can be pushed with advantage.

The majority of engineers have hitherto confined their attention to the use of aluminum alloys in the form of castings. The advantage in the use of wrought material, however, makes itself felt in several ways. In the first place the wrought alloys now available afford material of very much greater strength. Taking tensile strength as a rough measure, ordinary castings rarely exceed a figure of 30,000 lb. per square inch and even the best modern heat-treated castings of the alloy now coming to be known as "Y" only attain a maximum of 45,000 lb. and this is at best combined with an extension on 2 in. of 5 or 6 per cent. On the other hand, both "duralumin" and rolled or forged and heat-treated "Y" can readily be obtained giving up to 60,000 lb. with a ductility that shows an extension of 18 or 20 per cent on 2 inches. Further, the fatigue-resisting and other properties of these wrought alloys are far superior to the best castings. If it is desired to push tensile strength to its highest limits, values as high as 88,000 lb. combined with an elongation of 12 per cent on 2 in. can be obtained in alloys which are quite satisfactory if thoroughly protected from corrosion.*

Quite apart from their very much greater strength, particularly in regard to shock and fatigue, the wrought alloys possess a most important advantage over the cast material in regard to reliability. Even the best of castings are apt to be, at times, more or less unsound and it is often difficult, if not impossible to discover the existence of defects. In wrought material, on the contrary, serious unsoundness is substantially impossible. In the first place, material intended for rolling or forging is always cast into simple ingot forms in which soundness can be readily achieved, since they are free from the serious difficulties which occur in complicated castings where thick and thin portions are expected to solidify together. Further, should a defective ingot be produced, it generally shows signs of the defect during the forging or rolling operations—these operations, in fact, constitute a severe and thorough test of the homogeneity of the material, particularly in aluminum alloys in which the first stages of "breaking down" from the cast condition are always delicate and somewhat difficult. It would seem, therefore, that wrought material is in many ways superior to cast.

One consideration which must, of course, affect the designer's judgment on such a point is that of the relative cost of the two types of material. This can, in the long run, be decided only when actual market prices of castings and forgings or built-up parts are actually available. At the present time wrought material is not yet widely available and in many cases its price is high owing to the fact that heavy royalties on patented alloys have to be covered. The extension of our knowledge of the range of available alloys should soon overcome this difficulty, while the question of available manufactures is simply one of demand.

Parts in Which Alloys Can Be Used

The next point of interest centers on the question for what parts of an automobile can wrought aluminum alloys be employed. The answer is not easy to give without considering in detail the design in question, but, broadly speaking, it may be said that apart from parts in which great hardness and resistance to wear is essential, there is probably no limitation to the application of the light alloys. It is not suggested, of course, that this application will necessarily be wise or desirable in every case, but only that it is in most cases perfectly possible. It is obviously impracticable, in the limits of

*The figures briefly quoted above, together with full details concerning the composition and treatment and general properties of the alloys in question, will be found in the Eleventh Report to the Alloys Research Committee of the Institution of Mechanical Engineers, London, 1921. Since this report occupies more than 250 pages, it is obviously impossible to reproduce the details in the space of the present article, but readers interested in them can readily refer to the report.—W. R.

the present article, to go into any great amount of detail with a view to showing how such an adaptation could or should be made. All that can be attempted is to take a few typical examples by way of illustration and suggestion.

The aluminum alloy piston—by which is meant the cast piston—is already in extensive use and gives considerable satisfaction. Yet even here the use of forged material would offer undoubted advantages, particularly from the point of view of soundness and reliability. A good many existing pistons are, of course, of a shape which could not be readily produced even by considerable machining from any reasonable forging or pressing. It may be suggested, however, that these designs are perhaps needlessly complicated. The internal ribs, for example, are mainly a concession to the supposed weakness of the material; if the piston were made of forged material of considerably greater strength, these ribs could probably be eliminated and—if necessary—replaced by slight thickening of the piston wall.

Very satisfactory piston designs have, in fact, been produced which can be made quite cheaply and easily from a simple forging. This is of the form of a cylindrical block having a central depression or hole. This leaves a wall-thickness great enough to allow the bosses for the gudgeon-pin bearings to be left when the forging is machined internally. Ultimately, however, it may be found possible to press the pistons, not in the form of a nearly solid cylindrical block, but in the shape of a fairly thick-walled cup made from a thick flat disk of rolled alloy—much as a cartridge case is pressed from a strip of sheet brass.

Difficulties Encountered

The piston is an example which presents, by comparison, somewhat considerable difficulties. A complicated object such as some of the intricate crank-cases and cylinder blocks now employed would present even greater difficulties, and in those cases it is no doubt a very open question whether the use of wrought material would be in any sense worth while. It would probably imply the use of built-up parts which would require a considerable amount of machining and fitting together. An appreciable saving in weight could probably be secured but whether the built-up article would be as thoroughly satisfactory as present day castings is doubtful.

Before leaving the engine mention must be made of connecting rods and crankshaft. So far as the latter is concerned, the use of anything but steel cannot as yet be regarded as a practical possibility. It is true, of course, that at first the use of an aluminum alloy even for a piston was regarded as entirely impossible, but in the case of a crankshaft even preliminary experiments have yet to be made. In regard to connecting rods, however, the matter stands in a very different position. Engines have been run successfully and under severe conditions with aluminum-alloy connecting rods. In some of the trials these were made of precisely the same dimensions as the steel rods which they replaced and yet they operated with entire success. This is perhaps asking rather too much of any light alloy, but with a suitable increase in dimensions—while still leaving a considerable margin of reduced weight—there is no reason to anticipate anything but the best results. The use of these lighter rods will further improve the running of the engine, so that here there would seem to be a fruitful field ripe for an early advance.

Perhaps the most important application of wrought aluminum alloys in automobile construction will be found in the construction of the chassis or under-frame. Here there is the possibility of a very appreciable and important saving in weight with all its concomitant advantages—saving in engine power, in wear on tires and particularly in the power expended and lost in frequent starting and stopping and in rapid changes of speed on the road. Here there can be little doubt as to the practicability of replacing steel by a suitable light alloy. Attempts have, indeed, been made to produce a satisfactory cast-aluminum chassis and the resulting object has given remarkably good performance. None the less, the general considerations stated above in favor of wrought material apply with very special force to the chassis. The shape of the object, to begin with, renders it difficult to cast satisfactorily, and if it has to be built up there is no advantage in using cast rather than forged or rolled parts. The only difficulty at the moment is that suitable sections of rolled aluminum alloys are not commercially available, but here again it is entirely a question of an adequate demand.

No Technical Difficulty

There is no serious technical difficulty in the way of the production of any desired section in a light alloy if the same section can be produced in steel. The difference is that steel-makers have for long years been accustomed to producing heavy sections and forgings of considerable size, while hitherto manufacturers of aluminum alloys have had no occasion to deal with such objects. It thus becomes a matter for enterprise on both sides and for co-operation between two industries which may well become to that extent interdependent.

The question of the relative dimensions of a part made of wrought aluminum alloy as compared with steel is not easily settled. The actual working stresses in such parts are not really known with any degree of accuracy, particularly in regard to shock and fatigue. The dimensions of the steel parts themselves are, in the majority of cases, determined by judgment, based on experience, rather than by exact calculation, so that it is never very certain whether they are just strong enough or actually very much stronger than is essential. Taking the existing steel construction as a guide, however, it may be borne in mind that the best of the wrought aluminum alloys have about the same tensile strength as a mild to medium-hard steel. So far as "static" strength is concerned, therefore, it would seem safe to replace such steel with aluminum alloy of the same dimensions. Unfortunately, however, the light alloys have not as great a resistance to fatigue stresses as mild steel, and where such stresses are mainly operative it would seem wise to allow something like double the dimensions, or, rather, one-half the working stresses which are allowed in steel.

It must, of course, be borne in mind that by increasing the dimensions of a part acting as a beam, for instance, its stiffness is increased much more rapidly than its strength, and where fatigue stresses are mainly due to vibrations set up in the structure itself this increased stiffness must be taken into account, since it will serve to reduce the alternating stresses arising from vibration.

The question of stiffness raises the interesting point as to the application of light alloys in springs of various kinds. Here the lightness of the material and its relatively low elastic modulus—about one-third that of steel—suggests very promising applications. Some rudimentary experiments in that direction have given promising results, and it seems probable that in this particular field there is an immediate possibility of an important advance. In springs made of wrought light alloys it will, of course, be necessary to keep the working stresses relatively very low, but this necessity is more

than counterbalanced by the lightness of the material and its low elastic modulus, which allows, on the one hand, of the use of very much larger springs and at the same time permits considerable amplitudes of deflection without high working stresses.

Without having in any way exhausted the various possible applications of wrought light alloys in automobile construction, the examples which have been given will perhaps be sufficient to indicate the lines upon which application of these materials is suggested. It is, of course, a process which will require watchful care on the part of the designer and in the factory, but the possibilities of advance are very considerable and it is a course which is already being actively pursued in various quarters. The "all-aluminum car" may not yet be an achieved practical success, but it is likely to be so before long.

Question of Corrosion

There is, however, one point which demands serious consideration and that is the question of corrosion. There is no doubt that all aluminum alloys are more or less easily corrodible, but, after all, so is steel. In the case of steel we have learned to afford it fairly efficient protection. Our enamels and paints and other protective coverings are not perfect, but they suffice to give our structures a very good length of life, provided that they are efficiently maintained. There is no doubt that the same degree of permanence can be attained in regard to aluminum alloys. The real difficulty in regard to these materials arises from the fact that at one time it was widely supposed that aluminum was practically incorrodible. This idea no doubt arose from the fact that a brightly polished aluminum article left exposed to ordinary air, but not to rain, etc., remains bright for a very long time. Unfortunately, this power of resisting atmospheric corrosion does not measure the power of resisting more severe conditions. Alloys are known which will stand for many years exposure to the air in a room, but which will literally fall to pieces if immersed for a few hours in sea water.

Now the question arises, which of these two types of conditions as regards corrosion have we to meet in the parts of an automobile? It is, of course, obvious that these are not exposed to anything even remotely so severe as continued immersion in the sea. On the other hand, they are liable to be exposed to rain and even, at times, to sea air. Actually, even the more corrodible aluminum alloys show very little deterioration if exposed entirely unprotected on an automobile. Yet such unprotected exposure is not essential or even desirable in the important working parts. A large proportion of these parts in any case becomes coated with oil from the engine, gear-box, differential, etc., and this oily coating in itself affords very good protection from corrosion. At the same time there is no reason at all why any exposed aluminum alloy—other than in ornamental fittings—should not be well coated with protective varnish, paint or enamel. Such coatings, if well applied and of suitable composition, afford complete protection from anything to which an automobile is likely to be exposed.

But it is or will shortly be possible to go considerably further than this, as chemical processes have recently been worked out and in certain cases patented for covering aluminum alloys with a protective coating of a very perfect kind. One of these coatings is said to consist of a mixture of the sulphide and oxide of molybdenum which adheres very firmly and serves as an excellent protection, although possibly not entirely resistant to the direct action of sea water. It may, therefore, be safely suggested that the corrosion difficulty, in so far as it exists in regard to automobile work, can be satisfactorily dealt with by these means.

A Rubber Compound Battery Box

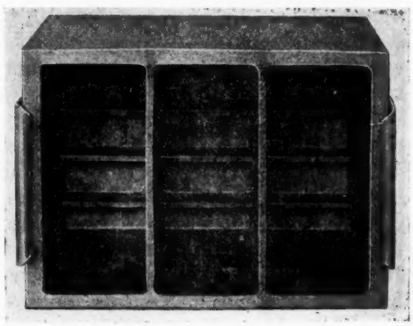
RUBBER compound battery boxes to replace those of wood containing hard rubber jars are now being manufactured by Rub-Tex Products, Inc., of Indianapolis. Many attempts have been made to make boxes of hard rubber, but it has been found that these boxes are too brittle and do not stand up under the freezing test. The Rub-Tex compound is made from a secret formula and it is claimed both these points have been overcome. In addition, it is claimed that these boxes overcome the difficulties encountered with pin-holes, blow-holes and other forms of leakage, which are common with hard rubber products.

In order to overcome these defects the Rub-Tex box is made by building the battery box up by hand, thereby laminating each piece of rubber and overlapping each piece at the corners. The boxes are then cured under very high pressure.

Battery manufacturers have been making tests on this type of box and, according to the Rub-Tex company, the box has stood up under a number of very difficult tests, among which is the following:

A box with the elements installed was placed in a refrigerator at 26 deg. below zero and left for a period of 48 hr. After this period the box was examined and found to be in an entirely satisfactory condition.

Another test was to install the elements in a box and place it upon a bumping machine. The box was given one million bumps, after which the elements were removed and the bridges at the bottom of the cells are claimed to have shown very little if any wear.



Battery box built up by hand and moulded under high pressure

A further test was made at the Detroit Testing Laboratories of Detroit, which gave the box a heat test for a period of 16 days ranging from 65 deg. Fahr. to 175 deg. Fahr., upon which a certificate was issued to the effect that there was no change in the color of the acid or in the consistency of the material. The box is claimed to have a dielectric strength of in excess of 26,000 volts.

The compound of which the box is made, it is claimed, has the ability to resist absorption of water or acid. The jars and box are combined in one unit, which gives it considerable structural strength besides that imparted by the physical qualities of the material.

Investigation of Tooth Wear With Automobile Gear Steels

Steel with a minimum of 0.45 carbon that is capable of treatment giving a scleroscope hardness of 75 or over is recommended for oil treating. The specification limits should be close enough to insure uniform results from a standard heat treatment. Various steps in the tests are described.

By E. R. Ross*

FURTHER investigation is needed to establish reliable data relative to the various factors that determine the smooth operation and life of gear trains. The research work could be divided under three headings, as follows:

1. An investigation to establish the most suitable material for use under given conditions, the allowable stress, allowable pressure, resistance to abrasion, and elasticity being found for different materials.

2. Investigation of methods of manufacture, with an attempt to define the degree of error permissible with various grades of workmanship.

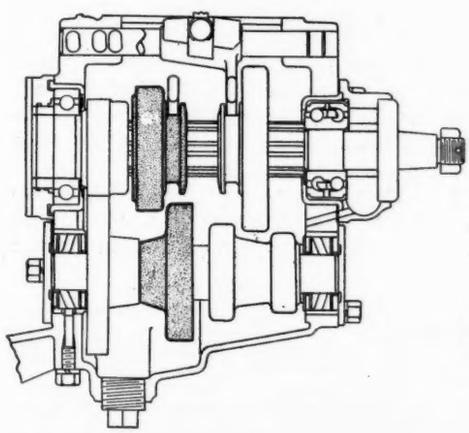


Fig. 1—Outline drawing of Warner transmission on which tests were made

3. A determination of the influence upon the life and quiet operation of gears of such variables as peripheral velocity, load per unit of width, number of impacts, ratio of reduction, grade of workmanship, heating and disposition of metal in the gear rims and arms. Methods of gear mounting to absorb vibration, and the lubrication of gears also would receive attention.

It will be agreed that successful research along these lines would provide dependable data for the design of gears to meet any conditions in regard to load, speed, quiet running, life, etc. Alone, the Lewis formula can be used only to ascertain the maximum permissible load to insure freedom from tooth breakage, and unfortunately with many gears this is the only point checked by the gear designer, with the result that gears are transmitting excessive pressure so that backlash and noise develop in a very short time.

With this outline before us in compiling the data of our tests, we have attempted to solve, in a measure, some of the most important problems that face the gear manufacturer to-day. The work we are now doing has been confined largely to the selection of materials best suited for the purpose of automobile transmission gearing, the selection being upon the basis of resistance to abrasion or wear. Two of our standard transmissions (Fig. 1) were used, which were checked over very carefully. We then proceeded with the tests by alternating the two, preparing the one while we were testing the other. All parts were checked carefully after tearing down the transmission; likewise all new parts were carefully checked before assembling.

This tranmission has 6/8 pitch gear of ¾-in. face and is well adapted to the needs of a medium weight and medium powered passenger car or light weight truck. The test was run on the second speed gears, or the third and fourth of a train of four gears (shaded in Fig. 1). This pair was selected because it is the most used of the speed reductions in passenger car service, and also on account of the difficulties presented by the manufacture of a sliding gear with internal clutch teeth. It is frequently used with a very high percentage of the full motor torque. These are "clash gears," and accordingly a portion of the face width has to be sacrificed in rounding the corners at one end of the teeth. As compared with the other reductions, a higher pitch line velocity is here combined with lower maximum torque.

In order that we might duplicate the conditions of individual tests, constant torque and constant speed were first considerations, and for this reason, standard dynamometer equipment was used.

Fig. 2 shows the set-up for the tests. The transmission is mounted on a suitable test stand which carries a stand-

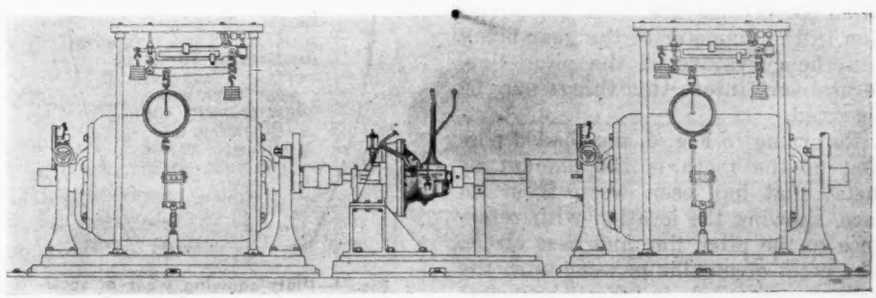


Fig. 2—Test set-up

*Experimental engineer, Warner Gear Co. Article is slightly condensed from paper presented at Rochester meeting of American Gear Manufacturers' Association.

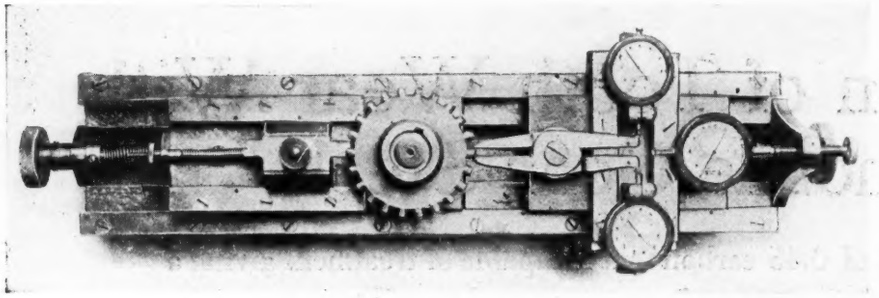


Fig. 3—Tooth profile indicator

ard bell housing and flywheel and is fitted with large roller bearings. Power is supplied to the transmission by a Sprague dynamometer, so the torque and speed can be accurately checked at all times. At the rear end the transmission connects to a second Sprague dynamometer by which the amount of power transmitted through the transmission could be checked.

A standard grade, heavy transmission oil was used both in the transmission and on the bearings in the test stand, new oil being used on each test. A thermometer inserted in the filler cap and extending down to the countershaft gear in the lower part of the case, indicated the temperature of the oil in the transmission.

Tooth Profile Indicator

To be able to properly classify our results, it was necessary that very careful measurements be taken of both the new and worn tooth, and for this purpose we developed a tooth profile indicator, (Fig. 3).

The gear is mounted on a stud in the center of the instrument. At the left, and pressing against the top and side of a tooth, is a stop which is held in this position by the spring behind the block. This holds the gear rigidly in position. Diametrically opposite this stop on the gear there are two fingers carrying points over the edge or profile of the tooth. At the right are two dial indicators, one for each of the points, which operate through a 1:1 lever. To the right of these and in the center is a third dial indicator. This is used to determine the depth or distance in from the point of the tooth to the points of the indicating fingers. The indicating fingers carry sharp points so that their leverage does not change from the 1:1 ratio and the indicators give a true indication of the contour of the gear tooth.

From the readings, plots of the gear teeth were made on a 7½ x 10 curve sheet, with an enlargement of 25. With this magnification, when the base circle and pitch line are located, when corrections are made for variation in the diameter of the gear blank and the curvature of the pitch line, several very interesting things may be observed.

Referring to Fig. 4, the shaded portion of the tooth is the amount of metal that has been worn from its face, showing the location with reference to the pitch line and base circle. The point of maximum wear upon the gear represented in the lower left hand corner was 0.012 in. deep and from 0.010 to 0.020 in. above the pitch line.

Since the wear is often unequal and we are unable to predict before the test just where it will be greatest, we select for measurement the tooth that shows the most wear. Fortunately, the chamfered end of the mating gear leaves an unworn portion which can be measured after the run, enabling us to compare it with the worn portion of the same tooth. The plot is a comparison of the original outline with readings taken in the center of the worn portion of the tooth.

Plots (Fig. 4) are from the second speed sliding gear (below) and the countershaft second speed gear (above), the material used in Test No. 6 being S A E No. 2345, having a hardness of 70 scleroscope. The gears were of 6-8 pitch and 20 deg. pressure angle, having 20 and 22 teeth respectively. The teeth had a 9/16 in. width of face in contact at the pitch line. The analysis given with limits is the standard specification for the material used, the figures in parenthesis giving the actual analysis of these gears. The heat treatment given this set of test gears consisted in heating to 1380 deg. F., followed by quenching in oil and drawing in oil at 400 deg. for 20 minutes. From the main drive gear to the countershaft drive gear the reduction is in the ratio of 27:15 or 1.8:1; from the countershaft second speed gear to the second speed sliding gear it is 20:22 or 1:1.1, making a total reduction of 1.636:1. A 50 hp. load was applied to the transmission by the dynamometer (175 lb.-ft. torque at 1500 r.p.m.) continuously for six hours. This represents an overload for this particular set of gears, being quite beyond anything to which they would be subjected in service. Preliminary runs demonstrated, however, that some such overload was necessary if we were going to have any measurable amount of wear in a test of reasonable duration. The six hour test would represent, in a car having 32-in. wheels and a 4¼ to 1 axle ratio, running on the

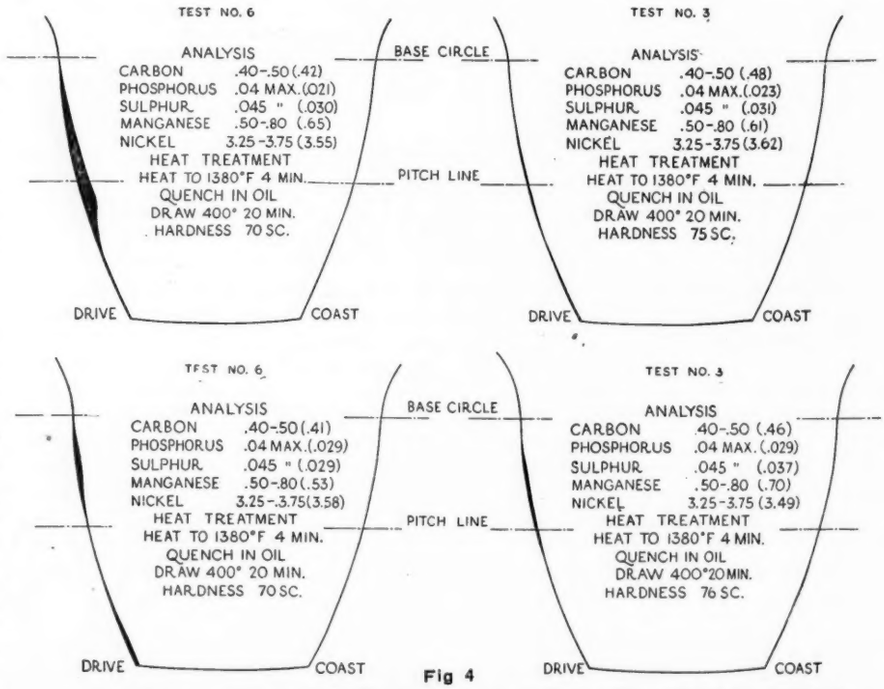


Fig. 4—Plots showing wear of tooth faces of driving (above) and driven (below) gear of S. A. E. No. 2345 steel drawn to scleroscope hardness of 70 (plots on left) and 75 and 76 (plots on right)

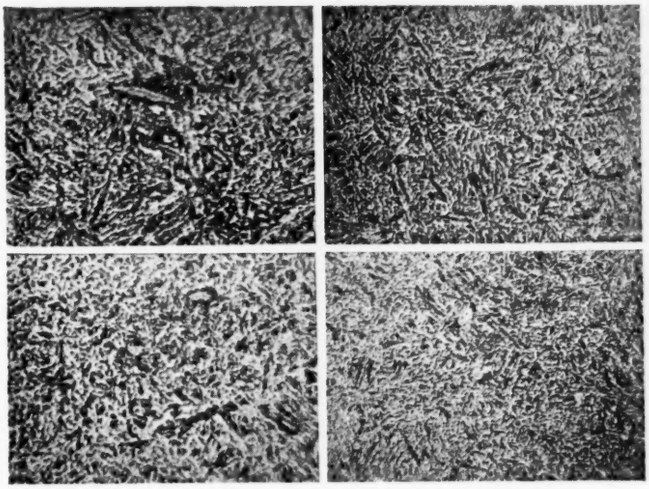


Fig. 5—Micrographs of steel in the gears of the plots (Fig. 4) showing finer grain structure of the harder steel

intermediate at a speed of 19 m.p.h. for a total distance of 114 miles. The transmission lubricant used was an oil designated as No. 1 heavy.

The test was conducted by holding the speed and torque of the driving dynamometer constant for the 6 hours, readings being taken of oil temperature, mechanical efficiency and room temperature at one minute intervals for the first five minutes, ten minutes after the start of the test, and at ten minute intervals thereafter till the end of the test. A given amount of the new lubricant was placed in each transmission when "set up" for the test and this was not changed during the test.

Minimum and Maximum Wear

Fig. 4 represents the best and worst conditions of wear on the oil treated gears tested. Both are of S A E 2345 steel, heat treated in the same manner and produced by the same cutter, but in Test No. 6 (at the left in Fig. 4) both the gears had a scleroscope hardness of 70 while in test No. 3 (at the right) the scleroscope hardness was 75 for the countershaft gear and 76 for the sliding gear. Note the variation in the analysis of these gears, as well as the relation between the carbon content and the amount of wear. In the latter connection it will be noted that the wear is greatest upon the driving gears, even though it may contain slightly greater carbon. This is a condition which would be expected when the action of the gears under load is analyzed. If the two gears had no backlash, any movement of the driving gear would correspond to an equal movement of the driven gear. In actual gears there is a certain amount of backlash to allow for lubrication, slight inaccuracies in the cutting of the teeth and warpage from heat treatment. Any increase of backlash due to wear permits an uneven or slightly intermittent velocity, which, once started, rapidly destroys the contour of the tooth. This action is more rapid on the driving gear, because it absorbs the variations in load and velocities resulting from the breaking down of the curvatures of both the driving and driven gear.

Gears from Same Cutter Compared

In order that we may get a representative test of the wearing properties of the steel and not a premature breaking down of the tooth curvature due to intermittent velocities or interferences, great care must be exercised in the selection of the cutters used for the gears to be tested, and for the other gears in the gear train under load at the same time. In order to eliminate all possible variation of the load in being transmitted through the first pair of gears in the train, new gears were used for each test. The heat treatment used was either that recommended by the manufacturer of the steel or what we had found by experience best suited to the steels used.

Fig. 5 shows micrographs of the gears of Fig. 4, left and right respectively. The coarser structure of the two steels at the left will be readily seen, and the relative proportions of martensite and troostite. Each steel had a scleroscope hardness of 70, the carbon content being 41 for the upper micrograph, and 42 for the lower. The two steels on the right are of a finer grain, of 65 and 76 scleroscope hardness, and have a carbon content of 46 for the upper and 48 for the lower micrograph.

A collection of 325 separate analyses of S A E 2345 steel shows that the carbon averages between 0.43 and 0.47, the manganese between 0.56 and 0.68 and the nickel between 3.36 and 3.50 per cent. The S A E limits on this steel are so wide that it is difficult to get a uniform structure from a common heat treatment in quantity production.

Effect of Carbon Content on Wear

Fig. 6 gives the analysis of the S A E 2345 steels used in tests Nos. 6 and 3. The average analysis is shown as the shaded portion between the dotted lines. It will be noted that the gears of test No. 3, which had the least amount of wear and the higher hardness, show a higher carbon content, a higher average manganese, and about the same average nickel as compared with the gears of test No. 6 which were softer and wore more rapidly. This will also be explained in a measure by the difference in the structure as shown by the micrographs of Fig. 5. The presence of more troostite in the gears having the low carbon may be accounted for when we consider that when a heat is used that is correct for the steel having the higher carbon, it is not high enough for the one having the low carbon content.

The gears of Fig. 7 are of the same material, with a difference in hardness of only three points. Here is very clearly illustrated the point mentioned before in regard to the importance of using gears cut with cutters having as nearly correct outline as possible. The gears of test No. 10 were cut with the same cutters as those of tests Nos. 6 and 3, but during the interval the cutters used for the countershaft gear had cut 240 gears and had been ground eight times, while the cutters used for the second speed sliding gear had cut 142 gears and had been ground five times. This change in the cutter gave an interference which was noted before the gears were tested. When this condition had been removed by getting the proper

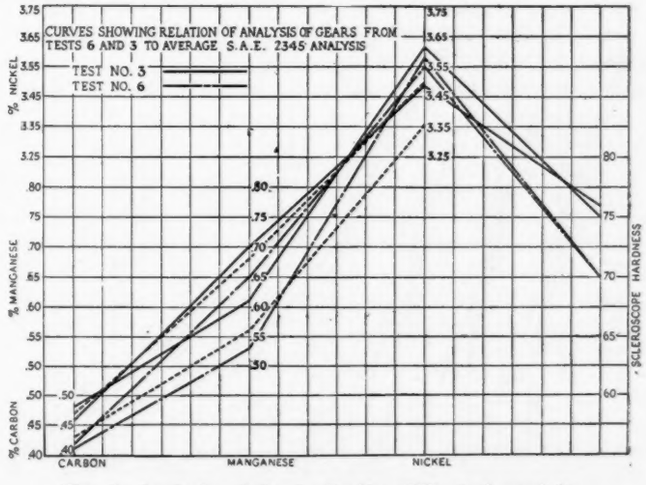


Fig. 6—Analysis of S. A. E. No. 2345 steel used in Tests Nos. 6 and 8

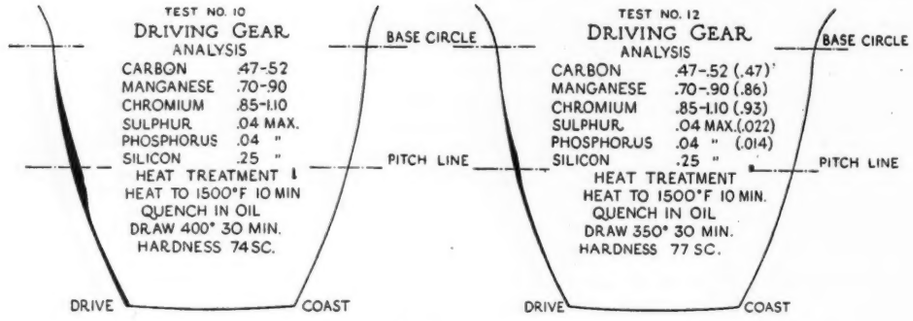


Fig. 7

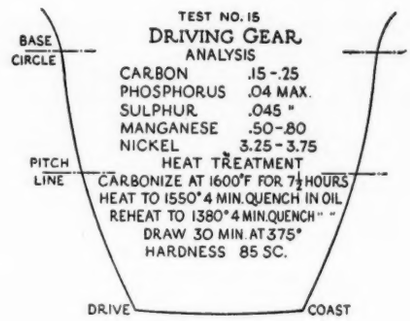


Fig. 8

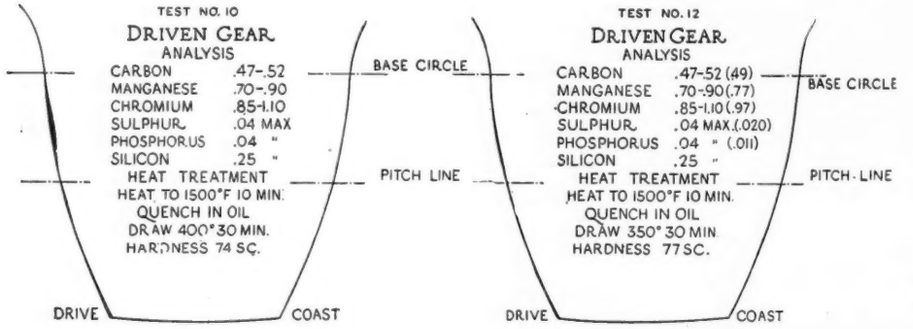


Fig 7—Plots of tooth wear from gears produced with worn cutters

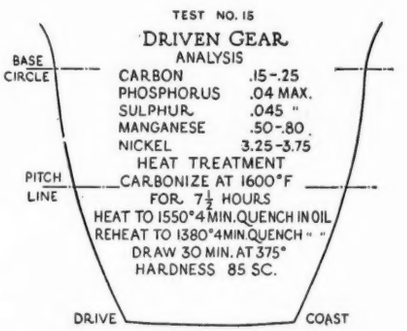


Fig. 8—Wear plots from case hardened nickel steel gears

curvature, the steel showed up very well, as will be noted from test No. 12.

Prevalence of Pitting

A comparison was also made between Test No. 12 and Test No. 3, both on gears of S A E 2345 steel. As before stated, the tooth showing the most wear was selected and indicated as representing the wear of that particular gear. In this instance the wear of the countershaft gear of Test No. 12 was measured on the only tooth that showed any particular breaking down. Three other teeth showed a very slight pitting, and the remainder of the teeth had bright burnished surfaces, scarcely having the tool marks worn from the gear face. The gears showed the following proportions of the whole number of teeth "pitted:"

Test No. 12 second speed sliding gear, no teeth pitted countershaft second speed gear, 18.18 per cent of pitted teeth.

Test No. 3 second speed sliding gear, 17.65 per cent of pitted teeth and countershaft second speed gear 84.2 per cent of pitted teeth.

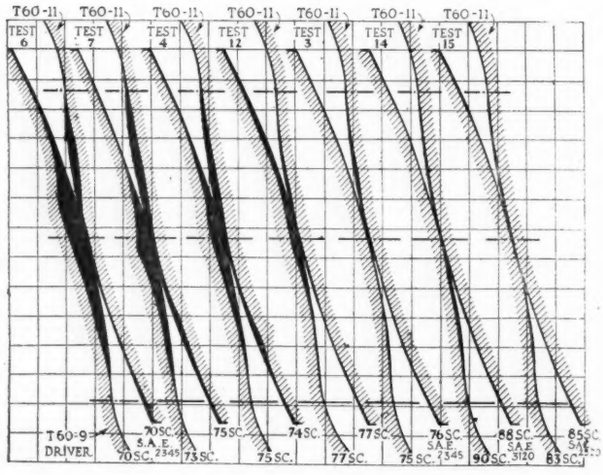


Fig. 9—Assembly of driving and driven faces

The steel used in Test No. 12 was a very "clean" steel and could be machined very much faster than S A E 2345. The latter steel has a great number of slag and cinder inclusions, which I believe to be a large factor in accounting for the pitting of this steel as compared to the steel used in Test No. 12.

A steel in all respects the same as used in Test No. 12 (48 to 51 points carbon and 77 scleroscope hardness) was tested by breaking two teeth out of the gear. The fracture in either case showed no tendency to be brittle but, on the other hand, was extremely tough, the teeth being broken out with considerable difficulty. The blanks as machined had a scleroscope hardness of 34 to 38 and a corresponding Brinell hardness of 207 to 228. No difficulty was experienced in machining this steel.

Oil-Hardened vs. Case-Hardened Steel

Fig. 8 shows test results obtained with S A E 2320, which is a case hardening steel having the same nickel content as S A E 2345 used in Test No. 3 (Fig. 4). Here again most of the wear comes on the driving gear. S A E 2345 has been substituted for 2320 largely because distortion in heat treatment causes it to be more noisy than an oil treated gear. An oil treated gear is not subjected to as high heats, and the length of time the gear is at high temperature is very short, which tends to decrease the distortion. The machine marks were still upon the S A E 2320 gears after the test and the gears showed no pitting whatever.

Fig. 9 is an assembly of the driving and driven profiles of seven tests ranging from the condition of the most wear as shown by Test No. 6 at the left, to the condition of minimum wear as shown by Test No. 15. The driving gear is the one at the lower left of each combination. This gives some idea of the relation of wear to hardness.

Here we may also study the progression of wear. Attention is called to the small worn portion of the driving gear of Test No. 15 at approximately 0.040 in. above the base circle, and also to the worn portion near the top of the tooth. Conditions in Tests Nos. 12, 13, 7 and 6, show how this action progresses, the destructive action having moved from slightly above the base circle up toward the

top of the tooth. Once this action has started on the faces of a gear, it progressively grows in intensity.

Oil Temperatures and Efficiencies

Fig. 10 shows the oil temperatures, mechanical efficiencies and room temperatures of test No. 15 on the S A E 2320 gears. As before stated, readings of oil temperature (from a thermometer inserted in the filler cap in the side of the case), readings of power output and room temperatures were taken at one minute intervals for the first five minutes, again ten minutes after the start of the test and at ten minute intervals thereafter. At the start of the tests the oil temperatures and room temperatures were the same and ranged from 60 to 80 deg. F. The oil temperature rose very rapidly for the first hour and had become practically constant at the end of the second hour. The maximum temperature reached during a test was 370 deg. F. The mechanical efficiencies averaged 96 at the start and had become practically constant at end of an hour.

The average maximum efficiency for the tests shown was 98.7 while the absolute maximum was 98.9. This is a power loss of 1.1 or 0.55 hp. for a 50 hp. load on the transmission. Properly constructed and properly lubricated, the automobile transmission is a very efficient unit.

Where the wear had been very great, the mechanical efficiencies rose gradually and fell off shortly before the end of the test, but did not give any marked indication of the wear, as is shown by the rise in oil temperatures which were practically without exception proportional to the amount of wear.

Considering that at this speed the tooth picks up its load more in the nature of an impact blow, especially when slightly worn, we have another interpretation of the tests in the order the load is transmitted to each gear of the train in the table following.

From a careful study of these figures and curves, which are representative of the tests we are making on steels for gears, we would recommend for oil treating, steel with a minimum of 0.45 carbon, that is capable of treatment giving a scleroscope hardness of 75 or over without brittleness and is as clean as it is commercially practical to make it; specification limits should be close enough to insure uniform results from a standard heat treatment.

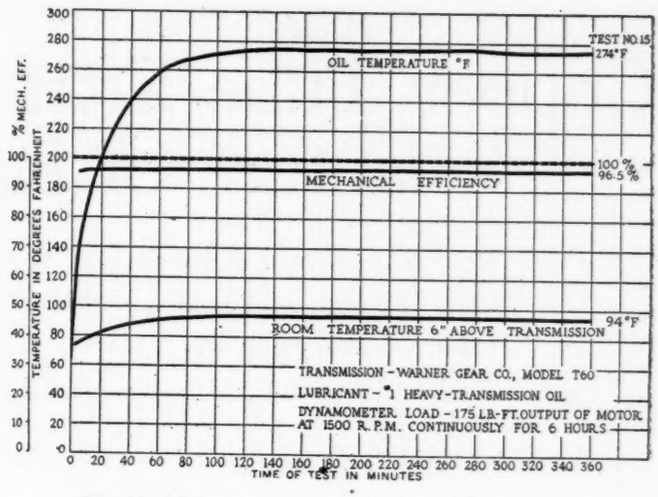

% MECH. EFF.
TEMPERATURE IN DEGREES FAHRENHEIT
TIME OF TEST IN MINUTES
OIL TEMPERATURE °F
TEST NO.15
274°F
MECHANICAL EFFICIENCY
100 %
96.5 %
ROOM TEMPERATURE 6" ABOVE TRANSMISSION
94°F
TRANSMISSION - WARNER GEAR CO., MODEL T60
LUBRICANT - "1 HEAVY-TRANSMISSION OIL
DYNAMOMETER LOAD - 175 LB-FT. OUTPUT OF MOTOR AT 1500 R.P.M. CONTINUOUSLY FOR 6 HOURS

Fig. 10—Oil temperature and efficiency of transmission

Order of Gear in Gear Train	Number of Teeth in Gear	Speed in R.P.M.	Pitch Line Velocity, Feet per Minute	Load at Pitch Line, Lb.	Load in Lb. per Inch of face (assuming ½" face)	Total Number of Impacts on each Tooth
1	15	1500	982	1680	2986.66	540.000
2	27	833.3	982	1680	2986.66	300.000
3	22	833.3	800	2063	3667.55	300.000
4	20	917	800	2063	3667.55	330.120

Advertising in South America

AN observer of South American conditions had occasion recently to remark that the advertisements in newspapers and magazines of that country lacked any distinctive style, and, in fact, poor styles predominate.

For the most part, he said, the advertisements are mere announcements that merchandise has arrived by such and such a ship. Or they are translations of exotic advertisements.

There is need for a distinctive style of advertising for South America; a racial style; something that smacks of the soil; a style of advertising that will be as effective with the South Americans as certain national advertising campaigns have been in the United States.

There are two main sources from which racy South American advertisements may be developed. The first is to be found in the literature and history of Spain and Portugal and in the literature and history of Spanish and Portuguese-speaking America.

The man who is to write South American advertisements that pull should study "Don Imjate" as the Pilgrim Fathers studied the Bible. In "Dom Imjate" may perhaps be found the subtle thread that will give the clew to Spanish character. In the Lusiadas of Camoens, the epic poem of Portugal, may be found many a side light on Portuguese character. In the history and literature of Brazil, Argentina, Chile, Peru, Colombia and Venezuela there is reflected, as in a mirror, the changes Spanish and Portuguese character has undergone in the New World. The advertising man should catch these characteristics from their history and literature and make his propaganda appeal to them.

The other source from which aid may be obtained in the creation of an original style of advertising for South America, is in the study of modern business science as expressed by Spanish writers. These are now appearing in Spanish and are widely read in South America. These publications, in many cases are adaptations of works issued in the United States. But they are not mere translations. They are transpositions and express the Spanish psychology.

The export departments of our manufacturers should have these books in their export library. A careful study of them by export advertising managers and export advertising managers' assistants will be a rather powerful influence in the creation of a proper expression for South American advertising.

A masterful dominating style of advertising for South America that has the touch of genius about it would aid American manufacturers as much as anything else in keeping their place in the trade of the Southern continent.

THE import duties on automobiles entering Sweden have been increased 100 per cent for the period from June 6, 1921, to July 1, 1922.

Copper Tube Extrusion and the Manufacture of Radiator Cores

How seamless tubes are formed from solid stock by cold extrusion, shaped with hex ends and baffles, tested under pressure and finally assembled and soldered into complete radiator cores. An apparatus for determining the relative efficiency of various types of cores is also described.

By Herbert Chase

THE advantage of seamless tube for use in radiator construction has long been appreciated, but the expense involved in making a radiator of the honeycomb type from such tube has until recently been too great for such radiators to be extensively used in this country, although some are used on European cars. It is difficult to make a thin walled seamless copper tube except by rather expensive drawing processes unless cold extrusion methods are employed, and this process has only recently been perfected. It was used extensively during the war for the production of tubes for cartridge shells, but has recently been adapted to the production of tubes of extremely thin walls well suited for use in manufacture of radiator cores. The process employed for making tubes and complete cores here described has been developed by the United States Cartridge Company, which is now producing both tubes and assembled cores in large quantities.

The material used for making the extruded tubes is practically pure copper. The process starts with solid cylindrical pieces of copper about ½ in. in diameter by ⅝ in. in length. These pieces are either punched from rolled copper sheets or cut from round bars. In the first operation a punch is forced into the cylindrical piece of copper so that the latter is rendered cup-shaped with rather thick walls and bottom. A second similar operation converts the cup into a thick walled tube or hollow cylinder with one end open and the other closed in whole or in part by a very thin flash. These two operations are performed in ordinary punch presses, the cylinders or cups being fed to them from a revolving table similar to that used in connection with the extrusion press (see Fig. 2) on which the next operation is performed.

After the hollow cylindrical pieces are formed they are conveyed to the extrusion press, the feed side of which is shown in Fig. 2. The cylinders are there placed on a revolving table from which they are fed by the star-shaped wheel shown at the left of the cut. Each press carries two dies and two punches. The dies are stationary, but the punches are carried on transverse reciprocating slides, *A* and *B*. When *A* is at its inner position the punch which it carries is directly over the center of the die which it enters on the downstroke of the press. At the same instant the punch carried by slide *B* is in its outer position and is picking up from the revolving table one of the hollow cylinders of copper. On the upstroke of the press slide *B* and the punch attached to it move to their inner position, the punch carrying with it the copper cylinder which it has just picked up. At the same time slide *A* moves to its outer position and on the downstroke picks up another cylinder. On the same downstroke the punch on slide *B* moves downward, forcing the copper cylinder into the die. The punch then becomes a piston which upon further downward motion forces the copper through the annular opening between the lower end of the punch and the hole in the lower portion of the die. Since the shank of the punch fits the die closely the copper is positively forced out through the annular opening and comes out in the form of a straight tube about 9½ in. long and having a wall thickness of 0.005 to 0.006 of an inch. Since the

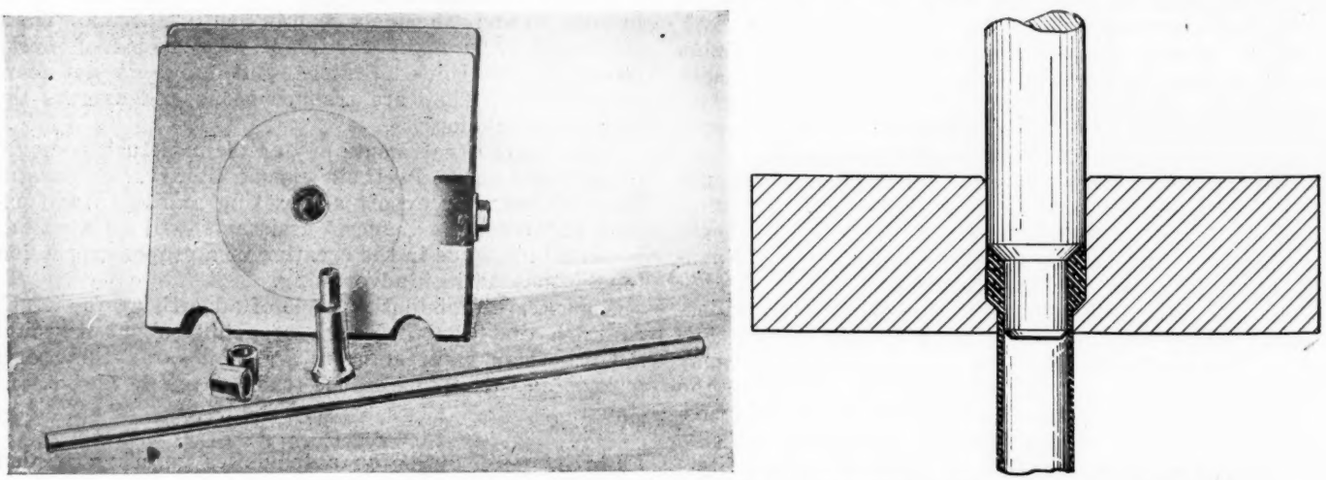


Fig. 1—(Left)—The extrusion die and punch. The copper cylinder is formed into the thin walled tube, 9½ in. long in a single operation lasting 1/40 part of a second. A sectional view of the punch and die is shown at the right

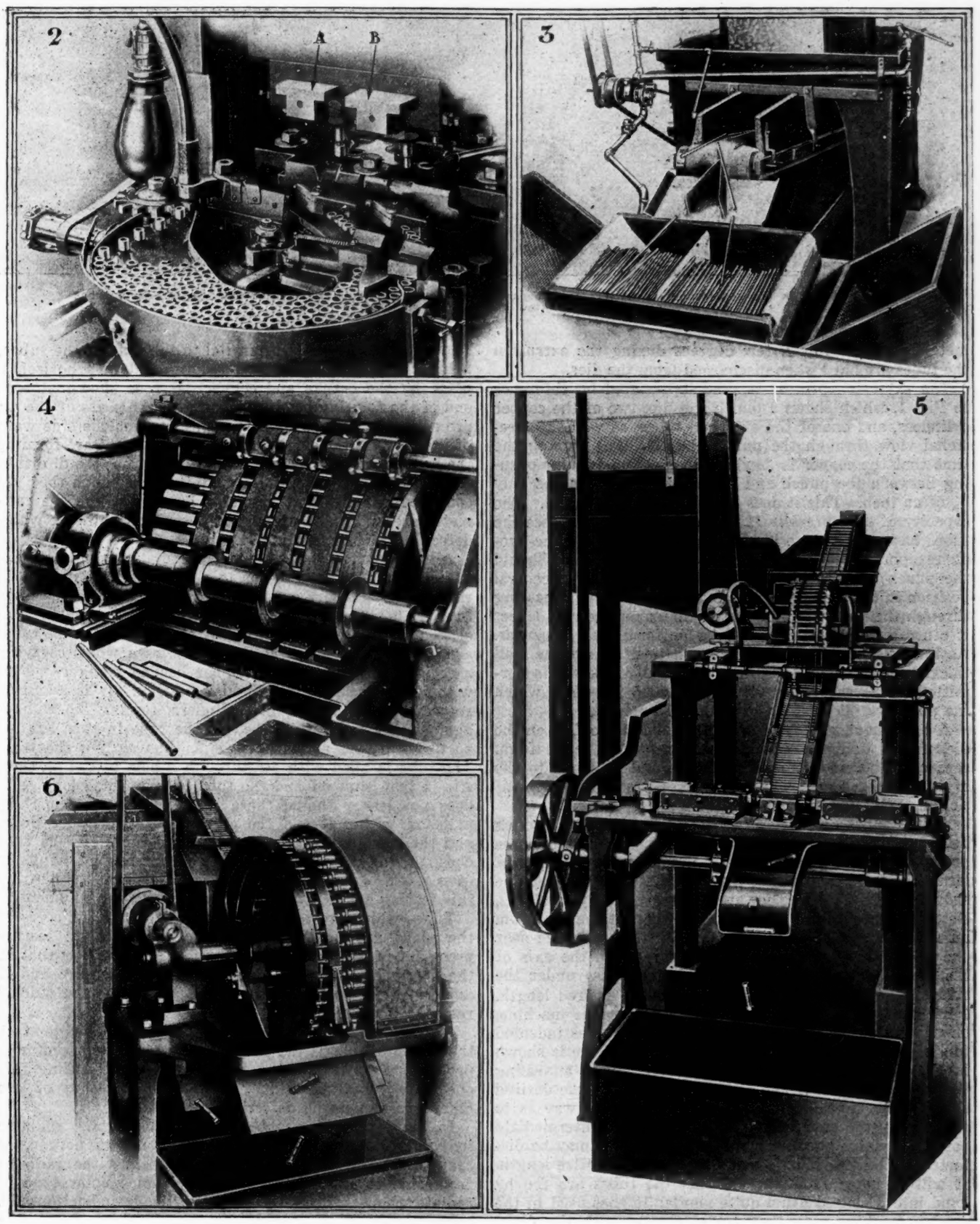


Fig. 2—The feed side of the extrusion press. The punch on slide A has just picked up a copper cylinder and is about to force it through the extruding die, while the punch carried by slide B is about to advance and pick up from the revolving feed table another cylinder which on the next down stroke of the press it will extrude from the second die. Fig. 3—Delivery side of the extrusion press. Tubes drop from the dies onto the endless belt and are discharged into boxes. Fig. 4—The high speed saws which cut the tubes to the desired length as they pass around the slotted drum. Fig 5—The combined annealing and forming machine. This machine has a capacity of 250 tubes per min. Fig. 6—The machine which tests the tubes under 15 lbs. air pressure and automatically rejects any which leak

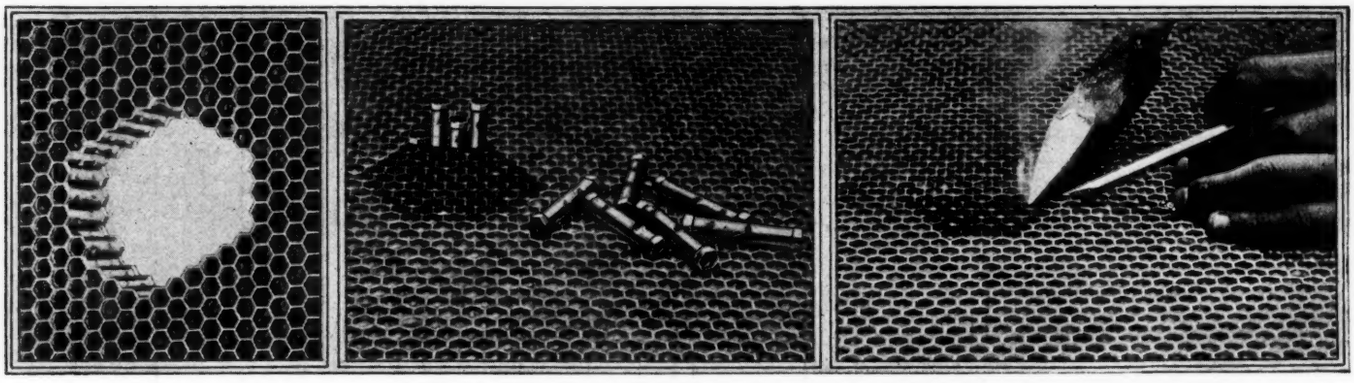


Fig. 7—Steps in the repair operation. At the left part of core with damaged tubes removed. Center—New tubes inserted. Right—New tubes being soldered in place

metal is heated only a few degrees during the extrusion the tubes are hard when discharged from the dies.

The extrusion process is best appreciated by reference to Fig. 1, which shows a punch and die, two of the copper cylinders, and one of the extruded tubes, as well as a sectional view through the punch and the die. During the time that the copper is flowing through the annular opening between the punch and the die the punch moves only ⅝ of an inch. This it does in 1/40 part of a second. The capacity of each press is 120 tubes per minute. Since the tubes have an average length of 9½ in. the machine produces approximately 100 ft. of tube per minute. Should the punch tend to move slightly out of its true central position in the die the greater friction of the metal passing through the narrower side of the annular space will deflect it centrally and thus maintain a uniform wall thickness. As the hole in the die or the punch itself wears the wall thickness will change slightly. The wall thickness is permitted to increase from 0.0055 to 0.0065 in., after which the punch or die bushing or both are renewed.

A continuous stream of lard oil is allowed to flow on the die, the oil being collected, passed through a centrifugal separator to remove metal particles, and returned to the extrusion machine. The press used is of the conventional crank type built by E. W. Bliss & Co.

As the tubes drop from the die they fall on an endless belt, as shown in Fig. 3, and are discharged into boxes provided for the purpose. They are then washed free of lard oil and are conveyed to the high speed sawing machine shown in Fig. 4. Here they are fed onto a slowly revolving, slotted drum. As the tubes fall into the slots on the drum an air-stream, issuing at high velocity from a nozzle near one end of the drum, moves them parallel to the axis of the drum against stop, after which they pass under the straps shown in cut and are sawed to the desired length.

The tubes are then ready to be fed to another machine, on which the hex ends are formed and the sides indented to give the desired baffling action. This machine is shown in Fig. 5. It performs the double function of annealing the ends of the tubes and of forming them to the desired shape. The annealing must be done in such a way as to soften only the ends of the tubes, while the intermediate portion remains hard, partly because the tube may be distorted in the dies if it is made soft over its entire length. It will be noted from the cut that the tubes are fed by hand into a slotted drum quite similar to that used in the sawing machine. As they travel around with the drum the ends of the tubes pass over a series of gas flames so adjusted as to anneal the ends of the tubes. They are then discharged into a slide and as they pass through the slide to the forming dies they are cooled by a stream of water. The forming dies are made in five parts. Two of these are punches of hexagonal sections but with rounded ends. The punches are moved parallel to the axis of the tubes, being carried by guides and reciprocated in a horizontal plane by the cranks and connecting rods shown at each end of the forming head. The other three parts of the die are so arranged as to make indentations on the side walls of the tubes at the same time that the punches are forming the hexagonal ends. As the tubes drop from the dies they fall by gravity into suitable containers in which they are conveyed either to the assembly benches where the complete cores are built up or to a testing machine in which defective tubes are rejected.

All tubes which are shipped to radiator manufacturers to be built up into cores or to repair stations for use in radiator repair work are tested in a special machine shown in Fig. 6. The carrying element of this machine is a slotted drum which rotates slowly and into which the tubes are fed by hand. As the drum rotates a wheel carrying a series of cylinders with rubber headed plungers moves with it. At the proper angular position air is admitted successively to each of the cylinders, forcing the plunger against the end of the tube and the tube in turn against a rubber gasket at its other end, thus sealing the tube. The tube is filled with air through a hole in the plunger. Air is then shut off and the tube is gripped as long as it does not leak. Should there be a leak in the tube the pressure within it and the corresponding cylinder drops and the plunger lets go, rejecting the tube. If the tube does not leak it is carried further around and mechanically disengaged, dropping into another container. Following this testing operation the tubes are ready for shipment.

Tubes which are to be assembled into complete cores at the plant are not put through this automatic testing process, but are tested after assembly and dipping; that is, the entire core is then tested under air pressure and if any tubes are found to leak these are easily and quickly removed and replaced.

At the core assembly benches girls are employed to stack the tubes by hand, the latter being quickly placed in a proper position to form a true honeycomb. During this operation tubes which may have defective ends or are otherwise seen to be defective are rejected.

In the flat tube or ribbon type of honeycomb radiator individual tubes are continuous from top to bottom, so that there can be no flow of water across the radiator from side to side. With the individual tubular type of radiator the water can flow either vertically or horizontally, consequently, it is necessary to supply sheet metal side members for the vertical core. This is done by using a piece of crimped copper having a width equal to the length of the tubes and so formed as to fit the side of the honeycomb section. This member is formed by simply running a sheet of copper of the desired width through crimping rolls having teeth of half hexagonal section. When the

core is assembled a crimped strip is placed at each side of the core between the outer and the second row of tubes. With this construction the outer row of tubes, which is usually hidden behind the casing of the radiator, does not come in direct contact with the water but acts as indirect cooling surface. The tubes outside the crimped sheet can be slightly flattened or otherwise distorted without injury to the rest of the core if the core itself does not exactly fit the casing. They also tend to prevent injury in transit.

After the core tubes are assembled they are clamped in a wooden frame and are conveyed to the shipping room, where the frame with the tubes is laid on a face-plate to bring the ends of the tubes into a true plane.

The ends of the honeycomb core are then dipped in a special soldering flux which is said not to change strength with use. The entire length of the tube is not treated with flux, the depth of dipping being determined by adjustable screw stops on the frame. The bath of solder, which is arranged in a tank adjacent to the flux bath, is kept at the desired temperature (as measured by a thermo-couple) by a gas flame. The honeycomb is dipped into the solder bath in precisely the same way as it is dipped in the flux, only the ends of the tubes coming in contact with the solder. First one side and then the other side of the core is dipped. The core is shaken to remove excess solder immediately after dipping each face.

Following the dipping operation the cores are thoroughly washed to remove all traces of flux. They are then ready for the top and bottom plates to be attached. These may if desired be of a temporary nature suitable only for testing purposes. In any case each core is tested under an air pressure of 15 to 20 lb. per sq. in. and if any leak is found a new tube is easily inserted.

In order to demonstrate the facility with which damaged tubes can be replaced in doing repair work, the writer, who recently visited the plant, was requested to deliberately damage a core with a hammer. The tubes within a circle of about two inches were thus broken and the core turned over to a repairman. All of the broken tubes, twenty-four in number, were removed in 6½ minutes. This was done by inserting in each end of the tube a soldering iron with hexagonal ends. Then, tapping the tube gently until it could be easily pulled out with pliers. The broken tubes were then replaced by new ones, a soldering iron being used to apply enough solder to hold the first few in place. The last four or five tubes were easily tapped in place by using a hammer, after which a small gas torch and an iron was used to apply solder at the joints between new tubes and between the new and old tubes. The entire repair job was completed in approximately 24 minutes.

In order to make the most efficient radiator possible with the construction employed it was necessary to determine what form of baffling produced best results. The experimental testing apparatus shown in Fig. 8 was used for this purpose as well as to compare cores made by the process described with those of other makes. By use of the baffles now employed it has been found possible to increase the cooling efficiency of the radiator over one without baffles approximately 25 per cent at air speeds up to about 60 miles per hour.

The testing apparatus is constructed as follows: A motor-driven blower is mounted on top of a closed air chamber into which the blower discharges. The only outlet to this chamber is through an air tunnel 1 ft. square in section and 10 ft. long. The joint between the tunnel and the air chamber is made by a rubber band in order to prevent vibrations of the blower and blower motor from causing the radiator to vibrate, since this was found to have an appreciable effect upon the results of the test. The outer end of the air tunnel is fitted with a shallow box with a gasket against which the sample core for testing is placed. When the core is in place it is connected to the water circulating pump and a gravity tank by rubber hose as shown in the diagram. Water drawn from the tank below the radiator is circulated through a gas water heater and discharged into a tank above the radiator. From this tank it flows into the radiator through a valve and flexible hose. From the bottom of the radiator water flows into another tank through another regulating valve.

A small float is placed in the upper chamber of the radiator, and the water circulation is so regulated by the valves that this float remains at a constant level. The thermometers are arranged to measure the temperature of the water entering and leaving the core and of air passing into and out of the core. A Pitot tube is arranged to measure the air velocity by the use of an inclined amometer. After an equilibrium condition has been established the rate of flow is determined by measuring the time required for a given weight of water to flow into the tank on the platform scales. The air velocity through the tunnel is varied by adjusting the slide which covers a part of the blower inlet. The apparatus is not intended to exactly duplicate service conditions, but is said to give true comparative results.

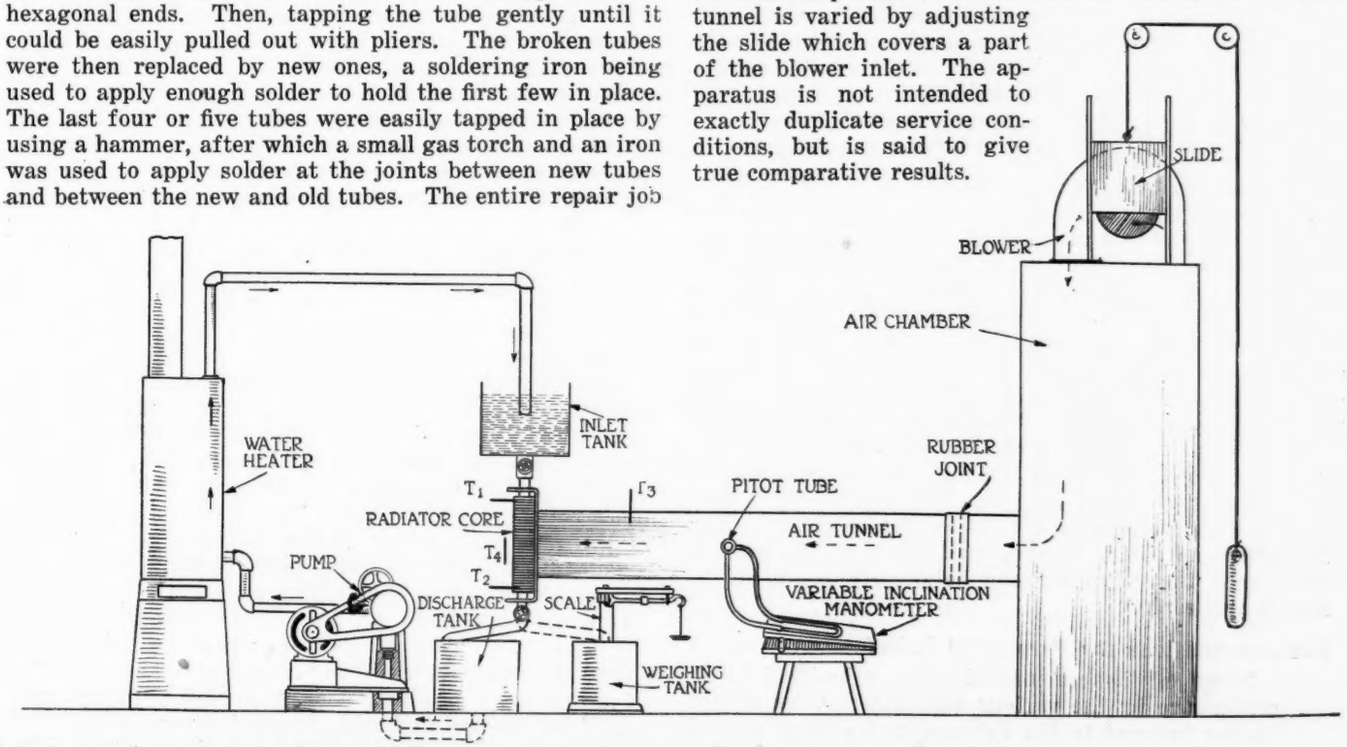


Fig. 8—Diagrammatic view of the apparatus used for comparative tests of radiator cores

Relief Methods Recommended at Unemployment Conference

Emergency measures looking to the solving of the present situation were adopted, but a program designed to prevent a recurrence of conditions as they are was suggested by the delegates. Adjustment of railway rates and completion of tax and tariff legislation were among important proposals.

PRESIDENT HARDING'S conference on unemployment has resulted in recommendations affecting practically all the major industries of the country. If they were put into effect to the extent that is obviously possible, they would go a long way toward permanent relief of the situation. The closing of the conference did not result in a flare of trumpets and the announcement that within a week the United States Government would be in a position to see to it that every unemployed man would have work, but rather there was a quiet agreement among the delegates as to the measures to be taken, and how they should go about the important task of putting the idle to work.

No big concerted action was agreed upon, but every city in the United States was allotted the task of solving its own situation along the lines developed at the conference. Vital matters were brought to the attention of Congress so that the members of that body could see how the measures they are deliberating upon would affect the situation, and the need for quick action was impressed upon them.

Actual, immediate and tangible results from the conference can only be accomplished through the co-operation of various cities and civic bodies throughout the country, as well as the co-operation of all industry. Secretary Hoover of the Department of Commerce, and chairman of the conference, pretty well expressed this feeling when, in his closing speech, he said in connection with the recommendations offered:

"You have laid out a plan. The plan has been willingly accepted by a large section of the country, and you have erected the machinery to pursue that work, and we will see if we cannot get through this crisis without calling on the funds in the public purse for support and subsistence of our unemployed. Whether or not we succeed in that will depend greatly upon the co-ordination and co-operation that we can figure from industries and civic bodies of the United States. That this is a problem for voluntary organization is consonant with American spirit and American institutions. If we cannot secure its solution in that direction, we shall have made a distinct step backward in the progress of this country. It is, therefore, vital that you who return for a term to your own sections of the United States should insist, in season and out of season, that this is a problem that rests upon the voluntary and neighborly action of the American people."

Recommendations for Permanent Relief

Many of the recommendations submitted to the conference by the various committees were of particular interest to the automotive industry, as well as to the country as a whole. Increased production, naturally, was one of the most proposed methods of alleviating unemployment, and just as naturally, increased production cannot be accomplished unless certain other things have been accomplished first. The general recommendations of the entire conference for measures looking to permanent recovery of employment seemed to strike at the bottom of the production situation.

There were eight of these recommendations, as follows:

1. Readjustment of railway rates.
2. Speedy completion of the tax bill.
3. Definite settlement of tariff legislation.
4. Settlement of financial relationships between the government and railways.
5. Limitation of world armament.
6. Minimizing fluctuations in foreign exchange.
7. Elimination of waste and a program of more regular employment in seasonal and intermittent industries.
8. Speedy adjustment of the inequalities in deflation.

All these subjects have been discussed at great length in connection with almost every problem that comes up. They affect not only the unemployment situation, but many other situations, and many of the others revert back to unemployment. It is a sort of endless chain effect, and despite the temporary measures urged by the conference, such as road building, home building and other projects designed to meet the emergency, little can be done toward permanent recovery of employment until these vital issues have been settled one way or another. Opinions may differ, it is true, as to what form the tariff bill should take, but either its enactment in any form or its definite failure of enactment, would prove a helpful factor, for then industry would know what to expect and prepare to meet conditions. It is the uncertainty of the thing that retards progress.

The readjustment of railway rates is recognized as a necessary step toward readjustment of conditions. The conference proposed that the rates be adjusted to a fairer basis of the relative value of commodities, and asked that special consideration be shown in fixing the rates upon primary commodities. This was in line with one of the recommendations of the agricultural committee, which insisted that the rates both on farm produce and on goods shipped to the farmer were entirely too high. The conference, however, did not overlook the fact that the financial stability of the roads should be safeguarded. Certainly lowering of railway rates would have the effect of stimulating production in that the purchase price would be lowered and sales would increase.

The tax and tariff measures are those which affect every industry and individual in the country. The con-

ference did not specify what tariff should be enacted, neither did it specify the tax rate, except to urge reduction of taxes, but it did point out that the measures must have something done to them in order to speed up a return to prosperity. Industry cannot prosper when it has no clear vision into the future. Until the clouds are removed from the political horizon there can be no rapid speeding up of production. Clouds are pretty good forecasters of a storm, and the good seaman will attempt to navigate around that storm. If it is blown away then so much the better, but if it is to come all industry is hoping that it will come soon, for afterward the skies will be clear and smoother sailing will lie ahead.

Aside from a lowering of their rates, the railways could perform other necessary duties that would tend to lessen the number of unemployed for all time. The present status of financial relationships between the railroads and the Government is such as not to inspire any too great confidence in the former's future. A settlement of these difficulties would obviously bring about increased railway employment and stimulate general employment. Immediate settlement of these relationships would provide immediate relief in that maintenance and betterment work could proceed, and when enlarged business comes the railways would be prepared to handle it.

Armament and Foreign Exchange

The prosperity of the United States depends not alone upon its own prosperity, but, especially since the war, upon the prosperity of other nations. A decrease in the tax burden of other nations would release more money from those countries for the purchase of American goods, and, conversely, a decrease of America's tax burden would allow the purchase of more goods abroad. One way of decreasing these tax burdens would be the reduction of world armament. Besides the economic benefits to be derived from such a move, there is the human side. Peace and tranquillity would be more nearly assured, and, after all, the human factor has a fundamental effect upon economic trends.

The decrease in taxes of all nations, and the consequent buying and selling between countries, would also have the effect of reducing the fluctuations in foreign exchange, another recommendation by the conference. The Committee on Foreign Trade, in its report to the conference, went into this situation quite thoroughly and pointed out some of the difficulties facing American business as a result of the fluctuations and suggested a few remedies. As the conditions stand, no merchant can well afford to take the risks of shipping his goods to a foreign nation with the knowledge that he cannot determine the delivery cost of any international shipment. The Committee on Foreign Trade pointed out as causes of the fluctuations the unbalanced budgets of many foreign countries, and the "unregulated demands of the German Government for foreign currencies in order to complete reparation payments."

This committee, in offering a remedy for these conditions, called on Congress to enable the administration to deal with the funding of foreign debts owed to the United States Government in such a way as to avoid injury to our foreign trade and our employment. It was also urged that the United States be effective in the deliberations of the Reparations Commission and other agencies, so that its influence may be exerted toward a reasonable control of the present unregulated payment of reparations by Germany.

A definite program of action that will lead to elimination of waste and more regular employment in seasonal and intermittent industries, in order that the drain upon capital may be lessened and the annual income of the workers may be increased, was another recommendation of the conference. The coal industry was pointed to as one into which seasonal employment enters, and the conference urged measures of relief taken in that industry at once. The Committee on Mines, in its report, suggested that railroads maintain at all times along their lines a supply of bituminous coal sufficient to last for five months. This suggestion should not apply only to the railroads, but to every other industry that uses coal as well.

Finally, the conference recommended a speedy adjustment of the inequalities in deflation. In comparing present price levels of various commodities and services with those of the pre-war period it was shown that agriculture has reached an unduly low plane, while transportation, coal and some branches of the construction industries are of the highest. An entire disproportion between the price of the primary commodities and the ultimate retail price was also declared to exist, and the reasons given for these increases were declared to be increased costs of transportation, enlarged profits, taxes, interest, labor and other charges.

"If the buying power of the different elements of the community is to be restored," said the recommendation, "then these levels must reach nearer a relative plane. For example, the farmer cannot resume his full consuming power and thus give increased employment to the other industries until either his prices increase or until more of the other products and services come into fair balance with his commodities and therefore the reach of his income."

All these recommendations may seem far away from the man who wanders the streets in search of a job. They appear, on the surface, to be connected with matters pertaining to government and politics, and, in fact, they are. These recommendations were made, however, after a careful study of the unemployment situation, and they were framed to correct the fundamental current evils. As far as being emergency measures is concerned they probably do not amount to much, but other methods were undertaken to care for the immediate needs. The methods discussed go farther than the present. They look to the establishment of permanent good business and prevention of a recurrence of present conditions.

The Business Cycle

The conference went to the extent of recommending an exhaustive investigation into the causes and remedies of periodic business depressions. Business depressions of other years were discussed in a report along this line, and it was declared that the long succession of business crises does not prove that the problem of controlling the business cycle is a hopeless one.

"The business cycle," said this report, "is marked by peak periods of boom between valleys of depression and unemployment. The peak periods of boom are times of speculation, over-expansion, extravagance in living, relaxation in effort, wasteful expenditure in industry and commerce, with consequent destruction of capital. The valleys are marked by business stagnation, unemployment and suffering. Both of these extremes are vicious and the vices of one beget the vices of the other. It is the wastes, the miscalculations and the maladjustments grown rampant during booms that make inevitable the painful process of liquidation. The most hopeful way to check the losses and misery of depression is, therefore, to check the feverish extremes of 'prosperity.'

The best time to act is at a fairly early stage in the growth of the boom."

This report went on to recommend that industry put aside financial reserves, to be provided in times of prosperity, for the deliberate purpose of improvement and expansion in times of depression. Such action, the report said, would not only lessen the depth of the valleys in the business cycle, but would also lower the heights of the peaks.

The emergency measures adopted by the conference are pretty generally known. As was pointed out, each community is given the burden to bear so far as the situation affects that community. Exchanges are being organized whereby a city with a shortage of labor can immediately be informed as to where the class of labor it desires is available. Employment agencies are busily engaged in securing and compiling information on employment opportunities throughout the country. If ship builders and operators are carrying out the recommendations of their committee there has been an elimination of overtime work for stevedores and men engaged in allied work. Rather there has sprung up a split-time basis in order to give jobs to more men. The committee urged that the United States Shipping Board expedite the breaking up of wooden tonnage on hand, and using the material for constructive purposes. Overhauling of ships likely to be used soon was another idea urged upon the marine industry. The Committee on Public Roads urged more activity in road building, and there were many other of these committee reports that offered emergency relief. These measures are being put into effect now, and in due time their result will be felt. But with all the emergency measures the result will be but temporary. Road work cannot go on forever, neither can the breaking up of wooden ships, and sooner or later men working as stevedores, or as anything else, must have full-time work. This can be brought about only by the adoption of a permanent policy that will stabilize industry in general and consequently stabilize employment.

Postal Rates to Pan-American Countries Will Be Lowered

THE lowering of postal rates and improvement of the parcel post to foreign countries is a subject of pressing importance to exporters and automotive manufacturers engaged in overseas trade. Consequently, the action of the recent Pan-American Postal Convention at Buenos Aires is fraught with promise for the future course of commercial relations between the countries of Pan-America.

In substance the convention's action will have as its result the lowering of postage rates from the United States to all countries of Pan-America to the domestic rate of two cents. This rate is now in effect to Mexico, Cuba, Dominican Republic, Porto Rico, Nicaragua, Honduras, Panama and the Canal Zone, Colombia, Peru and Bolivia. The Pan-American convention will lower it to all countries, and after it goes into effect the same rate will apply to Argentina, Brazil, Chile, Uruguay, Venezuela and elsewhere as for letter transmission in continental United States.

The simplification and betterment of the parcel post is perhaps of even greater import. At present it is almost impossible to send shipments of advertising or sales literature, catalogs, small parts and accessories to the various countries of Latin-America by parcel post. The regulations differ in each country. Special charges of various kinds, with numerous penalties for noncompliance with vexatious and little-understood rules, pile up on the receiver to such an extent that the parcel post can seldom be used.

The Buenos Aires convention eliminated all these vexatious regulations and adopted a single system that will be used in each country. In the words of O. K. Davis, who headed the American delegation, the result will be to exchange nineteen systems for one. The Pan-American limit for parcel post packages will be 10 kilos (22 lb.) except to a few interior countries in which special conditions limit the packages to half that size. This limitation does not pertain to the larger countries, such as Argentina, Brazil, Chile and Peru. Furthermore, all charges against the receiver of the package, except custom duties that are payable in the country of destination, are wiped out and replaced by a single charge of ten cents American gold assessed against the sender of the package. This single provision is declared to be one of the most important contributions of recent months to the promotion of closer trade relations between North and South America. It will eliminate the costly delays, penalties, charges, etc., that to-day pile up in some countries against the receiver and which make it impossible for the American shipper to use the system.

One point on which the convention was unable to act concerned the filing of consular invoices with parcel post packages and one slight reservation was made by Argentina against the convention because of its custom laws. Therefore, the matter of consular invoices must remain as at present, because any change in it concerns the custom laws of each country and, therefore, did not come within the province of the Buenos Aires deliberations. It has been proposed that a custom conference be held to take up this point.

The convention was unanimously agreed upon the proposals, with the reservations enumerated, and they will go into effect generally on Jan. 1, 1923. This delay was caused by the fact that the Mexican congress will be unable to act upon ratification before the latter part of next year, as it does not have another meeting before that time. However, the agreement provides that the provisions may be put into effect at any date prior to that time by countries ratifying them. This leads to the hope that its provisions will become effective in some sections shortly.

In commenting upon the convention, Mr. Davis declared that the results would go a long way in furthering Pan-American solidarity, as the rates provided are much lower than those prevailing between American countries and Europe. In fact, the American dollar was made the standard for the convention.

A NAPHTHALINE engine for stationary purposes is being manufactured by the Deutz Gasmotorenfabrik of Germany. The naphthaline is kept in the liquid state by means of steam generated by the exhaust gases, both the naphthaline container and the feed passage being surrounded with a steam jacket. Naphthaline at present costs only about half as much as benzol, the conventional liquid hydro-carbon fuel in Germany, on the weight basis. The engine must be warmed up with benzol or illuminating gas, and in the case of a 20-hp. engine it is necessary to run 15 minutes on this auxiliary fuel.

The Argentine Automotive Market

Here is the most recent and authoritative summary of the automotive situation that has come to the United States. Internal conditions in Argentina are fundamentally sound. First nine months of 1921 were dark ones, but a trade revival has begun. The reasons are discussed in detail.

By M. T. Meadows*

BUENOS AIRES, ARGENTINA, Oct. 1.

THE internal conditions of Argentina are to-day fundamentally sound. This, despite the fact that the country has undergone during the past ten months a period of business depression more serious than any experienced since 1914. The causes of this depression have been, broadly speaking, the decline in the values of Argentine foodstuffs and raw materials in the world's consuming markets with the aggravating circumstances of a restricted demand for these products, even at low prices.

The picture as painted during the first nine months of 1921 is a dark one. Happily its colors are now brighter. In fact, even the more pessimistic observers are granting that the worst of the storm has blown over and that an improvement may be confidently expected.

A month ago many business men thoroughly familiar with trade conditions in Argentina predicted a trade revival contingent upon three things:

First—General rains throughout the country.

Second—The conclusion of negotiations for a $50,000,000 loan.

Third—The granting by the National Bank of a two-year moratorium to its clients who had obtained credits on cattle mortgage liens.

During September the menace threatening Argentina with a disastrous crop and cattle failure, in the form of the most serious drought experienced by the country in the past decade, was dispelled by heavy rains which benefited all sections of the country. The $50,000,000 loan was secured and the last-named condition for a return to more prosperous times seems to be well on its way toward fulfillment.

It is true that the volume of Argentine grain exports during 1921 were vastly inferior to those effected during same period of the previous year. However, grain prices have been well sustained and farmers have received ample remuneration for their produce. Cattle prices during September have shown an increasing tendency upward. The effects of this steadiness in the meat market are already being noticed in the readiness of ranchers and interior merchants to purchase more liberally those commodities required by them. Another factor which is considered as most favorable is the decided firmness in the prices of hides which, of course, is having a marked influence in the betterment of the live stock business.

Fortunately, a growing demand for all grades of Argentine wool is to-day becoming more evident. Buyers are to be found not only for the finer wools, which met with some sale even in the period of the depression, but also for the enormous stocks of coarse wool which some months ago could not be disposed of at any price. These circumstances, together with the prospects of good crops, should mean that the Argentine can soon resume the purchase of American cars on a scale which, even though not commensurate with the demand during the past four years, will be sufficiently large to supply normal post-war requirements.

On Jan. 1, there were 3,500 automobiles held in the bonded warehouses of Buenos Aires. This number did not include Ford cars which are brought into the country as spares and assembled here. The liquidation of this stock during the present year has been slow but steady. By March 1, 2,003 cars were still in the custom-house. To-day the number in the custom-house is considerably less than 1,000. It is well to add that of this number more than 500 have already been paid for by the importers. Beyond a doubt, the end of the present year will see a final liquidation of these cars and certainly before the end of the spring and summer selling season now ushered in these vehicles will have been marketed and importers will be forced to place new orders.

Even a cursory investigation will demonstrate to what extent American cars predominate in the Argentine market. It is true, of course, that prior to 1914 European automobiles, especially French makes, were the only ones finding ready acceptance. The universal use of automobiles in Argentina is, however, entirely due to the popularity of the low-priced American vehicles. Not only in the Argentine cities, but even in the most distant hamlets and rural districts, Fords, Chevrolets, Dodges, Maxwells, Buicks, etc., are to be found in abundance. Higher priced cars are usually owned in the cities and larger towns, but Packards, Cadillacs, Hudsons, Hupmobiles, Studebakers, etc., are to be found here much in the same relation to the total number of automobiles as in the United States.

At the present time there are no statistics available giving the number of automobiles in actual use in Argentina. An effort is being made by the local Automobile Chamber of Commerce to take an automobile census, but this information will not be ready for publication before the end of the present year.

Automobile and tire importers estimate that from 70,000 to 80,000 cars are now being used in the republic. Of this number, approximately 55,000 are used outside of the larger cities. This plainly demonstrates the fact that ranchers and farmers are the heaviest buyers of automobiles. Buenos Aires is credited with approximately 15,000 cars in use within the city limits. Licensed taxicabs comprise about 6,500 of this number, with nearly 8,500 cars in the hands of private owners. The ready sale of the Ford is shown by the fact that more than 40,000 trucks have been sold in Argentina since 1914.

*Manager of Chamber of Commerce of the United States of America in the Argentine Republic.

New Commodity Divisions Will Give Industry Many Advantages

Reorganization of Bureau of Foreign and Domestic Commerce includes the formation of divisions that will function for automotive industry and rubber exporters as well. Collection and distribution of merchandising information as it is related to international trade will be chief task.

IT has been understood for some time that the Bureau of Foreign and Domestic Commerce was undergoing a general reorganization and that it would soon be equipped to handle the problems of American business in a more practical and constructive way than in the past. This reorganization has been completed to a large extent, and already the parts of the Bureau relating to automotive products are in a position to function efficiently. An analysis of the aims and possibilities of the reorganized Bureau indicates that a source of real aid to the manufacturer is being established which will help him in solving many practical business problems, especially those relating to international trade.

A general survey of the changes in the Bureau, together with a somewhat detailed discussion of the functions of the automotive division in particular, will make clear to manufacturers just what may be expected from the Bureau in the way of service, and how the facilities of the Bureau can be most efficiently utilized. The most striking development in the Bureau consists of the creation of fourteen new commodity divisions. The names of these fourteen divisions and of the men in charge are:

Agricultural Implements and Vehicles	George B. Bell
Automotive	Gordon Lee, Wm. I. Irvine
Electrical Goods and Machinery	Ruben A. Lundquist
Fuel	Henry C. Morris
Boots, Shoes and Leather	Arthur B. Butman
Lumber	Axel H. Oxholm
Foodstuffs	Edward G. Montgomery
Iron and Steel	W. S. Tower
Industrial Machinery	Walter H. Rastall
Rubber	Paul L. Palmerton
Textiles	Edward T. Pickard
Chemicals	(Open)
Paper	(Open)
Specialties	(Open)

These new commodity divisions are additional to the former geographic divisions, and are designed to render a distinctive service which has not previously been performed for American industry by the Bureau. The men appointed to take charge of the various commodity divisions have all been drawn from industry itself. They are men who have had practical experience in the industry which they represent and are thoroughly familiar with the requirements and problems of practical business.

It is the duty of these men to keep in the closest possible touch with the centers of the industries they serve by way of appropriate commercial organizations, trade papers, editors and individual manufacturers and merchants. They are charged with the responsibility of ascertaining the character of the information most urgently needed by their particular industry. With this as a basis, it is their task to utilize the existing world-wide facilities of the Department of Commerce, consisting at present of over 600 foreign representatives in promptly obtaining the information desired.

Their long experience in a special knowledge of the peculiar problems connected with each industry should result, it is believed, in the rendering of reports which will be understood in their true significance by the American business men concerned. These men will also see to it that reports reaching the department from all sources are properly interpreted from an industrial standpoint and are immediately submitted to the points where they will do the most good.

The automotive division has already begun to function actively. The co-operation of the National Automobile Chamber of Commerce has been extended to it, and through that contact considerable mutual benefit will doubtless accrue. One of the chief interests of the automotive division at this time is to get manufacturers to tell their troubles to the division; to let the division have their opinions as to what service they believe can be rendered, and the best form of rendering that service.

There is a vast amount of information available from consuls, trade commissioners, and commercial attachés, which if properly interpreted and compiled, will be of infinite value to American manufacturers in connection with their international trade. The agent's reports in the past have frequently been useless because the consul was not thoroughly familiar with the information desired and the use to which it was to be put. The automotive division is taking definite steps to acquaint the agents in various parts of the world with a detailed analysis of the sort of information desired by American automotive manufacturers, and will consequently have at its disposal before long really worth-while commercial data.

Analysis of Foreign Markets

It is expected that one of the members of the division will make an extended trip of several months shortly after the first of the year with the purpose of analyzing thoroughly, from the standpoint of American automotive selling, some specific foreign market. This survey will not be the usual seaport investigation consisting of general statements and hearsay data. It will be conducted with thoroughness and will be designed to reveal practical material of selling value. The man making the survey will go out with a complete knowledge of the marketing problems of the American automotive industry and will seek throughout the country the kind of specific trade information that would be desired from a personal representative of an individual manufacturer.

The first foreign market to be investigated in this manner will depend to a large extent upon the desires of the automotive manufacturers, but present indications are that China in particular, or the Far East in general, will be the first ground covered.

Efforts are being made to present statistical data to the automotive industry in such a way that it will be of practical value. The reclassification of automotive export statistics announced recently marks a definite step in advance. The reclassification as announced by AUTOMOTIVE INDUSTRIES, it will be recalled, affected cars, trucks, tires and aircraft. It showed that the American export statistics would be compiled and issued under the following classifications beginning with Jan. 1, 1922:

Cars

1. Under $800.
2. Over $800 and under $2,000.
3. Over $2,000.

Trucks

1. 1 ton and under.
2. 1¼ tons to 2½ tons inclusive.
3. Over 2½ tons.

Tires

1. Pneumatic casings for automobiles.
2. Other pneumatic casings.
3. Pneumatic tubes for automobiles.
4. Other pneumatic tubes.
5. Solid tires for automobiles and trucks.
6. Other solid tires.
7. Tire repair materials.

Aircraft

1. Airplanes and hydroplanes.
2. Other aircraft.

Comparing these classifications with the present one, it is readily evident that the export information available next year will be of far more selling value than it is now. These classifications, while perhaps not the last word so far as manufacturers' information is concerned, undoubtedly will reveal much information not now available and will enable American firms to analyze more intelligently the trade with various individual countries.

The handling of tractor statistics is another problem being discussed by the automotive and the agricultural section. A definite decision has not yet been reached in regard to the listing of tractor exports. There is some discussion as to whether tractors belong to the agricultural or automotive divisions. According to the present status, agricultural tractors will be listed in the agricultural machinery and implements section under the following heads:

1. Farm Tractors
   a. Wheel
   b. Track laying

Under the power generating machinery division will be listed the commercial tractors under this head:

Complete Tractors, Except Agricultural.

The inconsistency of this practice as regards tractors is evident from the standpoint of business needs and sales analysis. There is every likelihood that a better grouping will be determined before next year's program goes into effect.

These specific incidents are cited, however, to indicate the kind of problems with which the automotive division is concerned and to illustrate the practical efforts which are being made to render more effective existing potential services, to extend the service in many ways, and to enable the government bureau to function efficiently in cooperation with the automotive manufacturer.

The rubber division is also of special interest to automotive manufacturers since a large percentage of the material handled by this division relates to automobile and truck tires. This division is organized and functions as does the automotive and other sections, so that a few details of its work serve as typical examples of what it and the automotive division are doing.

Purposes of Rubber Division

The first purpose of this division will be to give exporters information that will be complete and accurate on the world's markets for their products. Two representatives of the division, one of whom will be traveling at all times, will determine just what information is desired by the industry and the complete facilities of the bureau will be used to obtain the data required. At present all information on the rubber goods market that is available in the Bureau of Foreign and Domestic Commerce is being gathered and filed in the rubber division. All this data will be checked for inaccuracies and incompleteness and the field force of the bureau will be asked to supply missing information or verify that now on hand. It is also planned to have questionnaires constantly going to representatives of the United States in all territories and a return stream of information always coming into the division.

Dissemination of this information will be partly through "Commerce Reports," and partly through answers to correspondence from manufacturers inquiring about some particular phase of the industry. Present indications have pointed out the fact that "Commerce Reports" will not be able to print all the information received, and for this reason answers to special inquiries will form one of the major outlets for the distribution of information. Special bulletins will also be sent out to the industry that contain pertinent information that cannot await publication.

As in the past confidential information will be sent only to firms that are American owned and controlled. Special trade opportunities and importers' lists will be sent only to companies who have filed with the bureau a form showing this to be true. The list of companies thus qualifying will form what is known as the Exporters' Index, and admission to this index can be obtained by applying for and filling out Form 57 which will be supplied by the Rubber Division upon request. Indexed firms will be given the advantage of having specific trade opportunities automatically delivered to them instead of having them published under a special key number.

Comprehensive Surveys Projected

As in the automotive division, collection and interpretation of statistics on the export trade will be a task of the division. Such statistics are now issued each month, but there are certain other channels, not now generally employed, through which the division will secure valuable information which will serve admirably as guides to better and greater markets. Certain markets, at times, will undergo unusually comprehensive surveys. This will usually be accomplished by putting a man from the division right in the country to be investigated. Rubber and motor journals from all over the world will be read and foreign competitors will be watched and reported upon.

The usefulness of the automotive and rubber divisions will depend largely upon the assistance given to them by the manufacturers and the extent to which manufacturers take advantage of the information which is being made available. The automotive section is among the first of the commodity divisions to begin to function at high efficiency and manufacturers are having opened to them a source of accurate and practical trade information that has not before been available.

Patent Bureau Efficiency Will Aid Manufacturer

The Lampert measure now before Congress would increase the salaries of employees and officials in this important government office as well as provide for a large increase in the working force. One-fourth of patents applied for affect automobile industry. Bill would aid in other ways.

SOMEWHERE beneath the measures affecting the tariff, peace with Germany, taxes and disarmament there lies in Washington a bill designed to increase the salaries and working force of the patent office. Whether or not it will be acted upon or even discussed at the present session of Congress is somewhat problematical in view of the rush of important legislation that representatives and senators are facing, but if it does come to the fore before adjournment, manufacturers of automobiles and automotive equipment will be particularly interested in its fate. Just what this will mean to the manufacturer in automotive industries can be realized when it is known that fully 25 per cent of all patents now being issued pertain in one way or another to automobiles.

A similar bill, sponsored by Representative Nolan, was defeated at a recent session after every indication had been given that it would go through. When this measure first came up there was scarcely a dissenting voice heard. The road seemed clear for immediate passage, when suddenly a provision was added that caused those favoring the bill to immediately change their views and the measure was defeated. The reason ascribed for this almost over-night reversal of opinion was a section providing that government employees who had patentable ideas should turn those ideas over to the Federal Trade Commission; the government would secure a certain amount of the revenue from the patent and the employee the remainder. This section of the bill was, no doubt, intended to encourage scientific men to enter the government service, but an analysis of the measure by various industrial interests brought out a few interesting facts that, when they became known, practically caused the bill's defeat.

The Objectionable Feature

It was pointed out that various government bureaus exist which are operated for the benefit of the taxpayer. The Bureau of Mines might be taken as an example, and a mine owner or his representative might write to this organization asking advice on some technical mining question. A government employee would be assigned to the case, solve the problem and send the answer to the mine owner. If the answer contained some original feature the bureau employee could patent the idea through the Federal Trade Commission, which in turn could bring action against the mine owner for an infringement of the patent rights.

It was this feature that caused the untimely death of the otherwise unobjectionable Nolan bill. The new measure, introduced by Representative Lampert, does not include this provision, but in substance its other provisions are similar to those in the original Nolan bill. The scale of annual salaries for various patent office officials would be fixed under the new bill as follows:

Commissioner of Patents, $6,000; first assistant commissioner, $5,500; assistant commissioner, $5,000; five examiners-in-chief, $5,000 each; chief clerk, $4,000; six law examiners, $4,000 each; examiner of classification, $4,200; two examiners of interference, $3,900 each; examiner of trade-marks and designs, $3,900; first assistant examiner of trade-marks and designs, $3,000; forty-seven principal examiners, $3,900 each; one hundred first assistants, $3,300 each; thirty first assistants, $3,100 each.

The schedule of salaries also includes many other assistant examiners, clerks and others at salaries ranging from $2,900 to $1,080 a year.

Patent Bureau Operates at Profit

These salaries are practically the same as those provided for in the Nolan bill. It has been repeatedly pointed out in connection with the request for higher salaries that the patent office is one of the few, if not the only government department, that operates at a profit. It has done this since its inauguration, and those friendly toward the measure are confident that the increased salaries will be taken care of by revenue from the office. In fact, the salaries were figured on this basis.

The bill, if passed, will mean considerable to the manufacturer, for with an increased working force the long delays prevalent between the time a patent is filed and when the first action is secured should be eliminated. At the present time the patent office force is composed of a few conscientious men who are doing all within their power to maintain efficiency, but their power is limited by lack of funds and lack of help. It has been figured that of the vast number of cases taken to the office to be examined, the examiner does not have an average of a full day for each case. Naturally this does not tend to increase efficiency.

The Present Salaries

As to whether or not the patent office officials and employees are deserving of an increase in salary it should be borne in mind that the last increase to this department was granted in 1907. The only increase prior to that time was back in 1840 or '45. At that time patent office officials received the same salaries as congressmen. The present scale of salaries is as follows:

Commissioner of Patents, $5,000; first assistant commissioner, $4,500; second assistant commissioner, $3,500; three examiners-in-chief, $3,500 each; chief clerk, $3,000; two law examiners, $2,750; examiner of interference, $2,700; examiner of trade-marks and design, $2,700; forty-three principal examiners, $2,700 each; sixty-three first assistants, $2,400 each.

There are, of course, many other assistant examiners and clerks who receive salaries below $2,000 a year. A part of the increase in the working force is shown by a comparison of the two tables of salaries. There are also additions in the clerical and examining forces provided for under the Lampert measure.

There is one thing that may stand in the way of passage of this measure. That is the fact that a federal commission has been working for a year or more on a general revision of government employees' salaries, and some congressmen may feel that this revision, when it is completed and acted upon, will take care of all departments alike, and dealing with one separate department would be somewhat partial. It is probably true that other departments are as deserving of increases as are the employees in the patent office.

Under the present system, or lack of system, of computing government employees' salaries a highly trained engineer in one bureau may be receiving an adequate salary, while on the next floor, in another department, there might be another engineer, with the same training, the same ability and doing equally important work, who receives half the salary of the first. The commission is working to overcome this discrepancy.

Other Important Provisions

But there are other portions of the patent bill that deserve consideration. The fact that it increases the working force of the department is enough in itself to make it a worth-while measure. Various provisions are attached to it, however, some of them merely being of a minor nature, but one or two are of sufficient importance to be commented upon.

One feature of the measure provides that when court action is begun in any patent case in the various courts throughout the country, the clerk of the court shall file notice of such action in the patent bureau within one month from the time such action is begun. This is not done at present, and parties interested in buying patents often go to the patent office to look up data on the case and remain uninformed of the fact that legal action is being taken for some cause or another. The provision states that the patent commissioner must have notice of such litigation filed with the original patent papers.

In the patent law now in operation there is a section providing that holders of patents who bring suit to recover alleged losses from the misuse of the patent must show definitely the amount involved and present other information that in most cases would be extremely difficult to secure.

A clause in the Lampert measure makes a new provision in this respect. The various federal courts are given the power to grant injunctions to prevent the violation of any right secured by patent, and, upon a decree being rendered in any such case for an infringement, "the complainant shall be entitled to recover, in addition to the profits to be accounted for by the defendant, the damages the complainant has sustained thereby." The measure further provides that "if on the proofs it shall appear that the complainant has suffered damage from the infringement or that the defendant has realized profits therefrom to which the complainant is justly entitled, but that such damages or profits are not susceptible of calculation and determination with reasonable certainty," the court may accept expert testimony on the subject and determine the amount the defendant has to pay.

This, of course, is a protective measure for the patentee and one to which he is entitled. Another protection offered the inventor is the barring of attorneys or agents who are incompetent or dishonest from having dealings with the patent office. The Commissioner of Patents is given the power to prescribe rules and regulations governing the recognition of such agents, and to require them to show that they possess the qualifications necessary to render their clients valuable service.

Fees Slightly Increased

The bill would also change the rates for patent fees as follows:

	Present fees	New fees provided
Due with application.....	$15	$20
Upon allowance of patent.....	20	20
Design patents—		
Three years six months.....	10	10
Seven years.....	15	15
Fourteen years.....	30	30

The Lampert measure would also add the following fees: On every application for the reissue of a patent, $30; on filing each disclaimer, $10; on an appeal for the first time from the primary examiners to the examiners-in-chief, $10, and on every appeal from the examiners-in-chief to the commissioner, $20.

It will be seen that one slight increase is effected in the new measure in that $20 instead of $15 is to be paid with each application for a patent. This increase, with the additional fees, should amply provide for the increased salaries asked for and keep the patent office a money-making department for the government.

From these facts it can be seen that, although the commission attempting to work out an equitable method of fixing salaries of government employees might find a satisfactory solution to the problem, there are other matters of importance contained in the bill. The salaries and increased working force are, of course, of prime importance, for both these provisions will mean increased efficiency and that is the factor the manufacturer will be most affected by. The other items are worthy of consideration, however, and worthy of support.

New British Society

A COMPARATIVELY recent body in England with a somewhat delicate but meritorious mission is the Society of Technical Engineers. According to the Journal issued by that body it has a twofold objective—the one connected with the interests of individuals and of the profession, and the other connected with the advancement of the British engineering industries. It will attempt to establish communications with individual employers and with organized employees in pursuit of both groups of its objects. In dealing with the manual workers, while the society will not associate itself with the labor movement nor seek to join the Trades Unions Congress, it will earnestly seek to find some means of co-operation with unions of manual workers in the industry in pursuit of the second group of its objects—those concerned with efforts to secure the advancement of the engineering industries of the empire.

It is the aim of the society, for the present, to make certain that technical engineers shall occupy and preserve a position intermediate between employers and workpeople, both within their firms and in relation to the organizations of employers and of workers. The society wishes to see the establishment of joint councils of employers and technical staff in suitable firms, which should in time come to discuss not only conditions but questions of technical engineering interest. The constitution of joint committees of technical staff and manual workers to consider means whereby the industry might be advanced would also be welcomed.

The Economic Problem of Marketing

How can consumption be increased to fill manufacturing capacity and decrease price, without lowering wages, so that the product will be cheaper in relation to the purchasing power? This is the economic problem. It must be faced and can be solved only by decreased merchandising costs.

By Harry Tipper

IN the previous article upon this subject some indication was given of the position of the United States in its growth of manufacturing capacity. It was stated that the manufacturing capacity had increased beyond the present market requirements and that the problem of filling this manufacturing capacity was to a great extent a problem of economic marketing.

Most lines of industry find themselves facing a serious problem of over-production capacity and the discussions of all manufacturing associations are devoted largely to the attempt to find a solution to this problem. In the metal trades industry, for instance, some manufacturers have decided to enter other branches of that business in order to fill out their capacity for production.

This may provide a solution for some of the individual manufacturers, but it is only temporary, because every line has a larger production capacity than is necessary for present consumption and the problem is not improved by shifting individual organizations from one line to another.

In the endeavor to secure a sufficient proportion of the market to keep the individual factory running at individual capacity, the competition will become keener and more ruthless, so that some of the factories in every line of business will be busy at full rate while others will have a percentage of idle time due to their inability to secure enough of the market.

Unless the manufacturing capacity can be used fully and intelligently, the interest upon the idle capacity investment will be a direct burden upon the industry, adding to the costs. Prices have a tendency to fall and this tendency will be continued with temporary fluctuations for some time. Only by manufacturing at full capacity and with the very best equipment can the price yield the proper profit.

The economic problem, therefore, may be stated in this way: How can we increase the consumption so as to fill the present manufacturing capacity and decrease the price without proportionately decreasing the wages, so that the product will be cheaper in relation to the purchasing power?

The same problem was faced by Great Britain after the Napoleonic Wars, and by this country after the Civil War. The problem was solved by the introduction of machinery and mechanical aids to manufacturing and transportation, so that the production capacity grew very rapidly. The price of production decreased very steadily and at the same time the individual wages increased almost as steadily. From the Civil War to about 1900, this progress continued.

In the face of declining prices the growth of industry will depend upon the ability of the manufacturer to produce and market his product at lower prices without being obliged to reduce his labor in proportion. People will consume more product if it costs less in proportion to their earnings.

The method adopted in the solution of the problem which we faced at the end of the Civil War cannot be relied upon to solve the problem today. The mechanical equipment of industry can be improved very considerably, but the improvement will be slower because the fabric is so much larger, so much more complete and has developed to a much higher stage of efficiency.

Undoubtedly great improvements will be made in manufacturing costs. The productivity of labor can be increased by large percentages. The character and capacity of machinery can be improved very greatly in almost any individual factory. The improvement in mechanics will not be made at the same pace, however, because any single improvement will have less effect upon the total costs.

On the other hand, the commercial costs of business have been increasing for a number of years. The efficiency of marketing and of all the commercial elements of the transaction have been decreasing, so that many of the economies secured in production has been cancelled by the additional cost demand as the production was completed.

The tendency of commercial costs is to increase. If the present tendency continues, a considerable part of the economy secured in production in the future will be absorbed by the increasing cost of the commercial transactions.

It is necessary, therefore, that the business of distribution and marketing with all its commercial elements be examined and analyzed, so that its costs are

MARKETING does not mean simply getting an order. It means getting the order at a cost justified by the character and extent of the order and under conditions which will make it possible to maintain the market with the least expenditure of time and effort.

A careful analysis of marketing is necessary to make it possible to obtain orders in this way. Practically no analysis of any importance has been made of marketing in the automotive field. Money has been spent on purely speculative possibilities. The manufacturer with a thousand cars to sell has not hesitated to try to sell those cars to four million people and to conduct his business as though such marketing expenditures were entirely justified.

reduced or the increase of costs at present operating is eliminated.

In the automotive field it costs far too much to market a vehicle or an accessory after the manufacturing is done.

The economic problem facing the automotive industry is the same that faces every industry in this country: How to keep the plant full, to lower costs without lowering wages in proportion, so that the purchasing power is increased in relation with the product.

The most important subject for analysis in the solution of this problem is on the commercial side of the business establishment, the costs which go into marketing, distribution and financing of marketing and distribution, the commercial overheads and similar functions.

Practically no analysis of an important character has been made of marketing in the automotive field.

Money has been spent on purely speculative possibilities without any knowledge of the limitations of the market or its reactions. The manufacturer with a thousand cars to sell has not hesitated to try to sell those cars to three or four million people and conduct his business as though the expenditure of money in marketing work on that basis were entirely justified.

The same manufacturer has distributed his cars, without regard to distribution costs, in any part of the country from which he could secure an order. Manufacturers of accessories and materials and parts have attempted to get distribution in every retailer's establishment, spending the same time and effort upon all retailers, although the buying capacity, the stability and the value of the retailers as customers vary very greatly, so that a considerable proportion of them do not buy sufficiently to pay for the efforts actually expended upon them.

The effect of turnover upon the capital invested in completed stock has not been sufficiently analyzed. Dealers' and jobbers' establishments have been stocked with material which has not been properly marketed, so that it would not move quickly enough to pay the interest upon the capital involved. Not only that, but the capital involved in distributing stocks properly arranged can be turned over at compound interest because of the opportunity to reinvest it frequently.

No analysis has been made of the effect upon costs produced by a change in the rapidity of the flow of products in distribution and marketing. Consequently, the cost of getting goods from the factory door through the manufacturer's commercial departments, the distributor and retailer to the final user, is unnecessarily high and has a tendency to increase constantly.

Unless better means of analysis are adopted this cost will have a tendency to further increase, because the intensity of competition will be increased and the efforts required to overcome the competition will add largely to the costs of distribution.

The most important problem faced by the automotive manufacturer to-day, therefore, is the problem of analyzing and reducing his marketing costs by the elimination of the observable and avoidable wastes, the application of known statistics properly judged and analyzed, keener understanding of the necessities of the distributor and retailer, and a far better knowledge of the problems of the user in both his buying and his service requirements.

Some consideration will be given in the following articles to the elements of visible and avoidable wastes and to the other factors entering into the marketing costs in the automotive field.

The problem must be faced. The growth of the business will depend upon the intelligence with which the problem is attacked and the character of the answer.

No sane man could justify the expenditures which have been made on the plea of sales and marketing in the past ten years. The profits may have justified such expenditures, but the necessities of the business did not justify them at any time. The observable wastes, which could be easily calculated by the analyst without much study, have run into thousands of millions of dollars every year in this field, and there are other inefficiencies that add measurably to this total. Even the economies so-called that have been established in the marketing departments since the business depression, have been established without any particular analysis, so that valuable and efficient means of maintaining a market have been eliminated or curtailed in common with the wasteful means, and valuable activities within the organization have been reduced in the same proportion as those of less definite efficiency.

Marketing does not mean simply getting the order. It means getting the order at a cost justified by the character and extent of the order and under conditions which will make it possible to maintain the market with the least expenditure of time and effort.

An Unusual Export Market

PUNTA ARENAS is the most southern city in Latin America. Situated on the Straits of Magellan, in the Chilean territory of the same name, it has a population of from 35,000 to 40,000 persons and is the entry port to a great sheep and cattle growing territory that stretches far to the northward. This territory, the development of which has no more than commenced, already requires many automobiles for its necessary transportation services.

The needs of the territory and of Punta Arenas have been only partially met, according to a letter from Jorge Skarmeta S., one of the dealers of that city, who writes to *El Automóvil Americano*, the Spanish dealer publication of the Class Journal Co., as follows:

"I believe that Punta Arenas is the last place in which the universal crisis is making itself felt, but not on as large a scale as is indicated by the news from other sections. Any improvement in the price of wool would quickly dispel any disturbance that might make itself felt.

"The slight crisis through which the city is passing, as you will see, is of a momentary nature and will disappear entirely with any improvement relating to the products of this section. As this is quite an extensive territory, its products will require automotive power to move them. At the present time nearly all the business concerns, even those on a small scale, need rapid transportation.

"For that reason you can see that this section deserves quite a little attention on the part of those who contribute to our automotive development. Not one-half as much has been done along these lines as would be possible in replacing unnecessary vehicles drawn by animals."

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE
Reg. U. S. Pat. Off.

PUBLISHED WEEKLY
Copyright 1921 by The Class Journal Co.
Vol. XLV Thursday, November 3, 1921 No. 18

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
Norman G. Shidle, Managing Editor
P. M. Heldt, Engineering Editor
Herbert Chase
Floyd E. Williamson

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
816 Fifteenth St., N. W.

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—317 Fort Street, West, Phone Main 1351
Cleveland—536-540 Guardian Bldg., Phone Main 6432
Philadelphia—1420-1422 Widener Bldg., Phone Locust 5189
Boston—185 Devonshire Street, Phone Fort Hill 4336

Cable Address.....Autoland, New York
Long Distance Telephone.....Bryant 8760, New York

United States and Mexico.....One Year, $3.00
Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
Canada.....One Year, 5.00
Foreign Countries.....One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Reduction of Unsprung Weight

QUITE the most interesting design of car at the recent Berlin show evidently was the Rumpler. The mechanical features of this car may be considered distinct from its extreme body lines, which are unlikely to appeal to American eyes. As regards the chassis, most interest attaches to the rear axle construction, which tends to materially reduce the unsprung weight. The first move in the direction of reducing the unsprung weight of the driving axle was made by De Dion as long as 20 years ago. On the car referred to the differential was suspended from the frame and the rear axle was made tubular and curved to the rear so as to clear the differential housing. Two universal joints were incorporated in each axle shaft, so that the chassis frame could move freely in a vertical direction relative to the axle without interfering with the drive.

This design improved the riding qualities, reduced tire wear and relieved strains on the chassis parts; but these advantages are gained at the expense of the use of four universal joints, each of which had to have about four times the torque capacity of a joint in the propeller shaft. Notwithstanding this drawback, De Dion used this form of rear axle for many years with entire satisfaction.

The tendency to reduce the unsprung weight is persistent. Numerous American manufacturers have tried out the transmission axle, in which the gearset is mounted at the center of the rear axle, but one after another they have given it up again. The reason is that the additional unsprung weight represented by the transmission in such cars is a detriment in every respect; it is hard on the car and hard on the occupants. Manufacturers using this construction sometimes made determined efforts to lighten their rear axles in other ways, as by the use of aluminum centers and alloy steel tubing and shafting, and in one or two cases the claim was made that the transmission axle weighed no more than plain axles on similar cars of less refined design. Yet the fact remained that if the gearset were carried on the chassis frame the unsprung weight would be reduced by just that amount.

In an effort to further cut down the unsprung weight several engineers in recent years have designed cars without a rear supporting axle, the weight of the chassis being transmitted to axle stubs by a combination of cross springs. Tests have shown that cars of this type are exceptionally soft riding. Similar riding qualities should be obtained by the Rumpler construction, because both the arrangement of the axle and the use of the cantilever type of spring tend to cut down the unsprung weight, which should not be much more than that in a car without supporting axle. Over the De Dion type the Rumpler axle has the advantage that it dispenses with the need for universal joints. An axle of this type could be used on a car having the engine located under a bonnet in front, and in such combination it would probably stand a better chance of success—in countries outside Germany, at least—than in combination with the rear-mounted engine and the ultra type of body.

New English Buses

LITTLE buying developed at the Olympia truck show in England. It is interesting to note, however, that what buying did take place was largely in the motor bus field. There were numerous inquiries for new motor coaches and omnibuses, and the indications are that firms which have made a reputation in this field of construction will profit considerably from the show.

While the general business depression appears to be seriously hindering any upward movement in British truck sales in general, the bus transportation interests are not seriously hampered by general economic conditions. Bus transportation has already taken a definite place in the British transportation system, and consequently bus companies are appearing as welcome buyers at a time of general depression.

A similar development of the bus movement in this country might furnish similar help to our truck industry.

A Message for Business

TWO historic events will take place in Washington next week. The stage has been carefully set for each, but with vastly different trappings. One will make history for a world in need and the other will be a dramatic reminder of history already written, but each bears a close relation to the other.

Business and industry, intent upon their immediate and individual problems, appear to have given scant thought to the significance of these events. World peace for the future and the great war which has gone by seem in some way remote from the manufacture, sale and transport of commodities, but those who seek the connection need not dig deep to find it.

Business has been bound up inextricably in every event which has happened since an Austrian archduke was slain at Sarajevo eight years ago and the world was set on fire. Business boomed and profits soared to unexampled heights while the drum-fire of cannon was heard from one end of Europe to the other. It was an inevitable concomitant of war. It was equally inevitable that the greater portion of those profits should vanish in the reconstruction of a world left rocking on its foundations when peace was signed and slaughter ceased.

It may seem a far cry from a survey of business to-day to a retrospective glance at the battlefields of France; from the study of a balance sheet to an international conference on the limitation of armaments. Each cause has its effect, however, and little happens in the world in which business does not play a part.

The nation has been asked to stand at salute for two minutes at noon of Armistice Day while an unknown soldier of the Republic is being buried in the hallowed soil of Arlington, where heroes sleep. The war lords who gather there and the elder statesmen of the nations they serve will meet in solemn conclave the next day to determine whether the crushing burden of armament cannot be lightened.

Soldiers and sailors with reversed arms, led by the commander-in-chief of the army and navy, will march behind the caisson bearing the flag-draped casket, to the measured cadence of funeral dirges. Great soldiers will pin upon the coffin tokens of valor taken from their own breasts. The simple soldier who gave his life that democratic ideals might not perish will win in death the Congressional Medal and the Victoria Cross, heritages of heroism. Gold star mothers will mingle their tears over the bier of the boy who might have been their son. No honor will be great enough for the unknown lad who fell in France, for he will be symbolic of all those who made the supreme sacrifice.

This solemn ceremony should do more than evoke a thrill of patriotic pride and a pang of sorrow in the hearts of Americans. They would do well to bow their heads and offer up a silent prayer of thanksgiving to the God they serve that they are citizens of the United States. Americans are fortunate, indeed.

They are not crushed under a load of taxation which is sapping their financial strength. Their nation is not standing on the verge of bankruptcy, battling bravely to keep from going over the brink. Their currency is at a premium the world around. Their mills and factories and municipalities are solving the problem of unemployment. They are not confronted daily by the spectre of another war. Opportunities for success are theirs to-day, as they were yesterday and will be to-morrow.

America suffered scarcely at all in the welter of war, and, in comparison with other nations, it knows nothing of the agonies of peace. It knows nothing of the stupendous problems of reconstruction and readjustment. The path to prosperity lies straight before it with only a few stones to be cleared away.

Have business men no interest in the symbolic burial of the unknown or in the arms conference which will follow it? Does it mean nothing to them that their nation, which need fear no foe, is leading the way in striving to lighten the burden of the world by cutting down the cost of armies and navies?

Do they want no part in turning the world toward a peace which shall endure and a prosperity which shall be great enough for all to share?

There is a message for business in the pageantry and pomp which are only a week away.

Car Shipments Show Slight Decline

Equal in Volume to Last October

Truck Business for Third Quarter Proves Better Than for Second

NEW YORK, Nov. 1—Shipments of automobiles for October were only 11 per cent less than the preceding month and for the first time since the process of liquidation began they were virtually the same as shipments for the same month of 1920. There is every reason to believe that from now on comparison of shipments and production will show a gain over the same month in the previous year.

The October showing is better than had been expected. Manufacturers believed at the beginning of the month that there might be a considerable decline in sales, but they have been pleasantly disappointed. October last year was 26 per cent less than September.

Truck sales are showing a slow but steady growth, and business for the third quarter was better than for the second, which ran approximately 100 per cent ahead of the first. Several of the larger companies have a substantial number of orders on their books.

Export business is slowly looking up. Canada and Mexico are among the best foreign fields at this time for American automobile manufacturers. Conditions in South America and the Far East are more satisfactory, and sales are gaining slowly in almost every quarter of the world except Continental Europe.

Factory operations this month will be carried on with caution. A few factories propose to increase their schedules to meet business on hand or in prospect. This is true particularly of those manufacturing cars in the higher price classes. On the whole, however, production schedules will be made flexible and the output will be governed entirely by actual sales.

While sales as a whole show little tendency to slacken, notwithstanding the approach of winter, manufacturers generally look for a tapering off in business between now and Jan. 1; but they have expected about the same thing every month since June. For that reason it may be possible that November business will exceed their expectations.

The fundamental strength of the industry and the deep interest of Americans in motor vehicles is evidenced by the fact that sales for the last seven months have varied only slightly from month to month and have been in volume sufficient to keep the industry as a whole, including many of the smaller plants which have done practically nothing, running at more than 50 per cent of capacity.

M. A. M. A. SEPTEMBER BUSINESS SHOWS GAIN

NEW YORK, Nov. 1—The volume of business done by members of the Motor and Accessory Manufacturers Association for September showed a slight gain over August. This marked the seventh consecutive month in which total sales showed slight variation. It is significant, however, that June was the only month to show a decrease as compared with the preceding month. Another striking fact shown in the report is that there was a change of only 00.22 per cent in the volume of past due accounts in September. For the first time since March there was a slight increase in the total volume of notes outstanding. The figures for each month this year follow:

Month	Total Purchases	Per Cent Change	Total Past Due	Per Cent Change	Total Notes Outstanding	Per Cent Change
January	$6,264,587	.....	$8,099,727	.....	$4,359,871	.....
February	10,408,962	66.15 Inc.	6,717,165	17.07 Dec.	6,063,118	39.08 Inc.
March	20,120,386	93.30 Inc.	5,603,992	16.57 Dec.	5,069,877	16.38 Dec.
April	26,746,580	32.93 Inc.	5.352,271	4.49 Dec.	5,371,086	5.94 Inc.
May	26,781,350	.13 Inc.	4,505,176	15,64 Dec.	4,460,355	16.77 Dec.
June	22,703,414	15.19 Dec.	4,720,973	4.79 Inc.	4,012,670	10.37 Dec.
July	23,096,214	1.68 inc.	5,242,046	10.79 Inc	3,690,154	7.90 Dec.
August	23,397,640	1.31 Inc.	4,348,790	17.06 Dec.	3,494,510	5.30 Dec.
September	23,141,891	1.09 Inc.	4,358,545	00.22 Inc	3,677,500	5.24 Inc.

Milwaukee Manufacturers Report October Increase

MILWAUKEE, Oct. 31 — Activity among manufacturers of passenger cars, engines, parts and equipment in Milwaukee during October showed on the broad average a slight gain over September. A few shops fell below the previous month's mark, but the majority were able to hold their own or to establish a somewhat better position. This is encouraging in view of the fact that September was not quite up to the August volume.

Makers of motor trucks and motor truck parts and equipment are in a more cheerful attitude than since last spring, due to an upturn in sales. Cold weather is expected to accentuate this advance in some directions and cause a reaction in others, so that opinion seems to be in favor of no marked activity in truck merchandising until spring. Export business in motorcycles is running better than expectations.

The export market is the principal one for this class of automotive merchandise, as many domestic prospects are able to buy a four-wheeled motor vehicles as cheaply as a cycle, and economy of operation is the biggest inducement for the purchase of cycles.

Harper Will Direct Sales for Studebaker

SOUTH BEND, IND., Oct. 31—Harry B. Harper, former president of the National Automobile Dealers Association and until recently the largest distributor of Willys-Overland cars, has been appointed sales manager of the Studebaker corporation. He will assume his new duties Nov. 7.

Harper's reputation as an automotive merchandiser is country-wide and has been gained by nearly 20 years of selling experience. He retired as advertising manager of Bowser & Co., Fort Wayne, in 1905 to become advertising manager for the Ford Motor Co. In 1907 he was made assistant to Norval Hawkins and in 1909 became Ford's first foreign manager. His work with the Ford company attracted the attention of John N. Willys and in 1911 Harper organized the foreign department of the Willys-Overland company. A year later he was made assistant to the sales manager and in 1915, 1916 and 1917 he was general sales manager for the Willys-Overland company.

Harper Long Distributor

Harper became Philadelphia distributor of Willys-Overland cars in 1918 and six months later he raised that city to first place as an Overland distributing center. He was sole owner of this business until the Overland company announced a new policy and established a direct factory branch in Philadelphia. Throughout his activities as head of an automobile sales organization, Harper has taken a deep interest in the affairs of his dealers. He has studied their problems from every angle and tried to give practical assistance. Few men in the country have wider dealer acquaintance than Harper.

C. O. Miniger to Join Durant Motors

Severs Connection with Willys by Jan. 1

Electric Auto-Lite President Will Become Director of Durant Subsidiaries

NEW YORK, Nov. 2—Clement O. Miniger, vice-president of the Willys Corp., as well as president and general manager of the Electric Auto-Lite Corp., will sever his connection with the Willys organization some time between now and Jan. 1 to become associated with W. C. Durant in the management of Durant Motors, Inc. No formal announcement of Miniger's plans has been made, but he will be a director of several Durant subsidiaries, including the Durant Motors Co. of Canada, Ltd. It has not been determined whether his headquarters will be in New York or Toledo.

Miniger ranks next to Walter P. Chrysler and J. R. Harbeck in the Willys Corp. He is credited with much of the success of the Electric Auto-Lite Corp., which has had a comparatively satisfactory business all through the period of depression, and is now in a highly satisfactory position.

The Electric Auto-Lite Corp. was organized by Miniger in 1911 and he became secretary and treasurer of the company. When John N. Willys associated himself with the corporation three years later Miniger was elected president and general manager. He has continued to occupy that position ever since. He also is president of the Fostoria Machine & Tool Co. of Fostoria, Ohio, vice-president of the Burt Foundry Co. of Toledo and director of the National Bank of Commerce and the Morris Plan Bank, both of Toledo.

Born on a farm at North East, Pa., on Nov. 11, 1874, Miniger was taken to Ohio by his parents at an early age and was educated at the Fostoria high school. He later took a course in pharmacy in Chicago after which he went to Toledo and entered the employ of a wholesale drug house as traveling salesman. He held this position for 10 years. His first business venture was the operation of a coal mine at Cambridge, Ohio, with offices in Toledo. He remained in that field for three years and then manufactured paper boxes for a like period.

There are reports, as yet unconfirmed, that another prominent figure in the automotive industry who soon will join Durant, will be Hugh Chalmers, who gained wide fame with the National Cash Register Co. before he entered the automotive field. His last active work in connection with automobiles was with the Chalmers Motor Car Co., which now has been merged with the Maxwell Motors Corp. He was president of the Chalmers company until the reorganization in 1918 when control was acquired by J. S. Bache & Co., bankers.

To Reorganize Signal Under Michigan Laws

DETROIT, Nov. 1—The Signal Motor Truck Co., a Maine corporation for which a receiver was appointed in Portland on Aug. 17 by Federal Judge Hale, will be reorganized this week as a Michigan corporation. It is learned that the property of the company was taken over Oct. 26 by a former officer as an individual pending the reorganization. The new company will retain the same name and there will be no change in its products.

The petition for a receiver was filed by Milton B. Hoagland, vice-president and general manager of the company, in accordance with a vote of the stockholders. The Maine company has outstanding $548,000 in common and preferred stock in addition to a funded debt of $190,000 in bonds and $220,000 in notes. J. G. Heaslet was president of the old company and H. H. Emmons was secretary.

Cunliffe, Branch Head, Leaves to Join Collins

CHICAGO, Nov. 1—C. R. Cunliffe, for more than ten years associated with the Cadillac organization, has resigned from the general managership of the Chicago branch of the Cadillac Motor Car Co. to become associated in an executive capacity with R. H. Collins, former Cadillac president and now president and general manager of the Peerless Motor Car Co. of Cleveland.

Cunliffe came to this city Aug. 1, 1919, for the purpose of opening the local branch, the understanding being that after its establishment he would take up other work. During his administration the floor space used by the branch has been more than tripled, necessitating the erection of a new service building. Previous to coming to Chicago, Cunliffe served as manager for the Cadillac distributor in Philadelphia.

His successor here is L. B. Sutherland, who has been associated with him in various capacities. Sutherland, who is a resident of Chicago, has been sales manager of the Chicago branch for the last two years.

New Gray Product to Be in $500 Class

Output Will Start Early in Year —12 Points for Assembling Cars

DETROIT, Oct. 31—F. L. Klingensmith, president of the Gray Motor Corp. and former vice-president and treasurer of the Ford Motor Co., has announced that the new Gray car will be priced at approximately $500 in the open models and will be in production following the first of the year. Associated with Klingensmith in Gray Motors is Frank F. Beall, former Packard vice-president.

The Gray car will be shipped in a knockdown condition to 12 assembly points in the country, the engine and parts to be made in the Gray plant here which is to be enlarged. The Gray car has been in development for more than a year, its introduction being deferred until the market was considered satisfactory.

The car follows the usual lines, having a four cylinder engine and will be made so as to be readily assembled. It will have a 100 in. wheelbase and be made of alloy steel. The company is capitalized at $4,000,000, which is said to be the nucleus of a planned $50,000,000 corporation.

In a statement of his plans, Klingensmith declares his knowledge of low-priced motor cars gives assurance that he will be able to build a motor car which will compete successfully with the world. He adds that this was what he had in mind when he retired from the Ford organization. His plan of operation calls for the purchase of all parts except the engine.

It is stated that $1,500,000 already has been put into the company and that an additional $2,500,000 in stock will be underwritten. The first $500,000 will be 10 per cent preferred to sell at $10 a share.

The directors of the company are Klingensmith, Frank F. Beale, Paul R. Gray, David A. Brown, J. H. Poole, George H. Kirchner, H. B. Hoyt, O. J. Mulford, Benjamin S. Hanchett and Luman W. Goodenough.

MILLER RETIRES AS JOBBER

NEW YORK, Oct. 31—Charles E. Miller, who has conducted for years one of the largest automobile supply houses in the United States, has decided to retire from the general automobile jobbing business. He will establish himself as a manufacturers' agent after selling his present business as a going concern.

Trucks Led Federal Plan to Meet Strike

Arrangements Evolved by Government Will Probably Stand for Future Emergencies

WASHINGTON, Oct. 31—Plans of the Federal Emergency Organization for the movement of necessities in case of a railway strike, as made public by Secretary of Commerce Hoover, show that the motor truck was the keystone of the Government's transportation plan. Everything was in readiness for the strike, which was called off. The Motor Transport Division was created with Windsor T. White, of the White Truck Co., as chairman, and Gordon Lee, chief of the automotive section, Department of Commerce, as his assistant.

Headquarters in Washington

The plan of operation drafted for the emergency will undoubtedly hold good in the event of a similar condition arising in the future. The organization was to have had headquarters in this city with its primary object the handling of interstate and inter-regional problems, and all other activities were to be left to the local initiative of Governors' organizations.

The program called for the determination of the primary, secondary and tertiary stocks of food, fuel and feed throughout the country. Primary stocks were those available within State radius; secondary, those within interstate water and motor radius; and tertiary, those within interstate rail and water radius.

It was also planned to determine the areas dependent upon interstate movement for supplemental supplies. Furthermore, it was believed advisable to ascertain the character of movement, whether by water, rail or truck, required or available.

Local Surveys Also

The Federal authorities, after a series of conferences, arrived at the conclusion that trucks should head the list of transportation units. In addition to the Federal survey they planned to have each locality make its own survey of commodities and the transportation problem. One of the significant features of the plan shows that the utmost reliance was placed upon the efficiency of truck operation. The official report of the plan as distributed to the State organizations, contains statements that two alternatives would be apparent in the service: first, that the railways cease operation and that reliance be placed solely upon trucks and water; and second, that limited operation of railways would be maintained.

The Department of Commerce plans to supply graphic maps to State committees showing primary reserves of each commodity available without movement. They intend also to make known the secondary reserves which could be obtained by motor and water movement. The plan called for the establishment of priorities on commodities. It was the idea of the Department to make reports to individual organizations as to truck transportation available and truck mobilization for long and local hauls.

Assuming that railroad operations ceased entirely, it was pointed out that all towns and cities outside the "dense area" could supply themselves by motor or water for at least sixty days without any consequential interstate movement. The "dense area" comprised New England, New York, New Jersey, Delaware, Maryland, Pennsylvania, Ohio, Indiana and Illinois. It was suggested that steps be taken by the local authorities in anticipation of any difficulties to supply gasoline.

The Department of Commerce declares that two primary changes in the situation from pre-war conditions are to be noted: first, by war experience the country understands the whole process of civilian and industrial organization to meet emergencies; and second, the motor truck has given every town an extended radius of food supplies by some 50 miles and thereby protects such vital matters as milk and perishables against the first shock.

The automobile industry has been much concerned over the mobilization points which the Government would select in the event of a strike. The Department of Commerce divided the country into regions under regional representatives. The first region covering the New England States centered at Boston; the States of New York, New Jersey, Delaware, centered at New York City.

(*Continued on page* 897)

Darrow and Dinsmore Join Goodyear Tire

AKRON, Nov. 1—Burgess Darrow has been appointed development manager and R. P. Dinsmore chief compounder for the Goodyear Tire & Rubber Co. following the resignations of W. S. Wolf and W. P. Keith.

Wolf and Keith have joined the staff of Frank A. Seiberling, formerly Goodyear president and now owner of the Lehigh Rubber Co. at New Castle, Pa., and organizer of a plan to amalgamate a number of smaller rubber factories into one large corporation.

The resignations are in line with others which have been previously announced and others expected as Seiberling completes his new organization.

The resignation of K. B. Kilborn as experimental engineer to be succeeded by V. V. Messer has also been announced by Goodyear.

Darrow and Dinsmore are graduates of the Massachusetts Institute of Technology in chemical engineering. Darrow came to Goodyear ten years ago in development work in the California Goodyear Co.

Dinsmore has been with Goodyear eight years and was in charge of compounding work several years ago when he assumed the same duties at the Canadian Goodyear plant.

Malleable Castings Discussed by S.A.E.

Better Understanding Regarding Their Use Urged at Cleveland Sectional Meeting

CLEVELAND, Nov. 1—More than 70 members of the Cleveland section of the S. A. E. listened to an address by H. A. Schwartz, manager of the research department of the National Malleable Castings Co. on malleable castings in the automotive industry. Most of the talk was made in explanation of lantern slides.

There is too much misunderstanding regarding the use of malleable castings in the motor car, Schwartz showed in reciting cases of certain cars which have 31 malleable castings but which the sales organizations often declare have none at all.

To-day the malleable casting industry is at 35 per cent capacity. There are 176 manufacturers of malleable castings, all of them being located east of the Mississippi River. Two electric furnaces are used in the manufacture of such castings, but no difference in the merchandising of these products is being made. One difficulty in the manufacture of malleable castings little appreciated in the motor industry, it was stated, is that nine days are needed in the proper annealing. Too frequently purchasing agents are delinquent in placing orders and become impatient at the delay in receiving shipments, which is due largely to the time needed for correct annealing.

The council of the S. A. E. met here in order to be present at the Cleveland section meeting. President David Beecroft addressed the latter on the necessity of sections using part of their program in better selling the standards that have been adopted by the society. One manufacturer of bolts and nuts is saving $500 on these products daily due to S. A. E. standardization. As yet there is not so wide an appreciation of the dollar and cent valuation of standardization as there should be, he said, and urged that the S. A. E. members sell the work to their own executives.

Auto Body Co. Awarded Contract by Durant

DETROIT, Oct. 29—Auto Body Co. of Lansing has been awarded the contract for all open bodies for Durant Motors of Michigan, whose plant at Lansing is ready to launch production in November.

The body company after making the necessary equipment arrangements will start at once upon the Durant work, deliveries going forward at once and continuing through 1922. The styles of the bodies have been laid down by Durant engineers and will be along conventional lines. A large number of men will be added to the force now employed to meet the new contract demands.

Sees Motorization of Interurban Cars

Truck Maker Receives Inquiries As to Types and Costs of Engines

CLEVELAND, Nov. 1 — The truck business in Cleveland is picking up. While the passenger car business has held up well in the Cleveland territory during the first three weeks of October, there has been a slight decline as compared with the corresponding period last month. This decline in October in passenger car business is said not to be so great on the average as it has been in other years.

Peerless Motor Car Co., for instance, reports that October business is on a par with September. The Stearns Co. reports that its passenger car business increased in October. There may be other exceptions in this city, but it may be fairly stated that there has been a slight falling off in volume.

Public Utilities Interested

Both the passenger and motor truck business was much better during the first three weeks of October this year than it was in the same month in 1920, according to reports.

At the general offices of the White Co., the prediction was made that in the immediate future there is to be a great development of business with certain public utilities that are now operating their cars at a loss with electricity.

The motorization of the interurban systems of the country at no great future date was predicted and, in substantiation of the prediction, White officials said that many inquiries are being received from interurban companies about types of engines that could be used and the cost.

The interurban roads in Ohio have been down-at-the-heels for years. Most of the companies have paid no dividends and they have been steadily losing business to motor buses in late years. Stocks in the companies are far below par and a great many shares have no market.

Operation Costs Less

It costs about $3 a mile to operate an interurban car with electricity, while it can be done for less than a dollar with a gasoline engine, according to statements made at the White company. The State Public Utilities Commission has found the interurbans to be a millstone under existing conditions that they cannot shake. Motor vehicles are hauling much of the freight that formerly was delivered to the electric cars. A large element of the traveling public that used to ride in interurban cars are now using either their own automobiles or the public motor buses.

The Ohio Public Utilities Commission has had its attention called to the advisability of changing from electricity to the gas engine. Several interurban lines have shown enough interest to write the White company about the subject. The utilities commission would have to authorize a bond issue, as the interurban lines now have hardly sufficient money to operate their plants.

The motor truck is the center of attention temporarily, at least, on account of the publicity that was given the threatened railroad strike. In every community the motor truck resources were offered to the mayor. The truck as an agent for short hauls was brought forward in a manner by the proposed strike of railroad employees that created a good will of inestimable value.

Hares Motors Completes Plan to Handle Thomart

NEW YORK, Oct. 31—Hares Motors, Inc., has practically completed negotiations with the Thomart Motor Co. of Kent, Ohio, under which it will take over sales of the Thomart truck.

President Thompson of the Thomart company, in announcing that a contract had been agreed upon, stated that the plant at Kent would be placed on a highly efficient basis to meet the increased business which is expected. The company manufactures a light speed truck.

The fact that Hares Motors is taking on this new line will have no bearing whatever on the continuance of its selling arrangement with the Kelly-Springfield Truck Co.

French Automobile Salon Draws 463,285 Visitors

PARIS, Oct. 22 (*By Mail*)—Nearly half a million persons paid for admission to the French Automobile Salon during the twelve days the Grand Palais was open to the public. The exact official figure for paid admissions is 463,285, giving gate receipts totaling 1,555,849 francs, or about $112,000 at present exchange. The biggest crowds were received on the last day of the show, when 57,499 persons paid to pass through the turnstiles.

At the last show held in 1919, 438,552 persons entered the Grand Palais.

REORGANIZING STANWOOD

NEW YORK, Oct. 31—Plans for the reorganization of the Stanwood Rubber Co. provide for the issuance of $300,000 in first mortgage bonds; $500,000 in first preferred 8 per cent stock; $151,000 in second preferred; $175,000 in debentures and $50,000 shares of no par value common. The creditors will receive 50 per cent of their claims in debentures and 50 per cent in new common based on a value of $2 a share.

NEW ARMLEDER TRUCK

CINCINNATI, Oct. 31—The O. Armleder Co. is bringing out a new Model 30 with a capacity of 1½ tons. This will fit in the line between the present Model 20 and the Model HW. The engine is a Buda, 3¾ x 5½ in., wheelbase 147 in., and final drive by Timken worm type axle.

Maibohm Receiver to Continue Plant

Petition in Bankruptcy Filed to Save Company — Creditors Have Refinancing Plan

TOLEDO, Nov. 1—Efforts to save the Maibohm Motors Co., Sandusky, through a reorganization were the basis for a petition in bankruptcy filed in Federal Court here last Friday. The assets of the company are listed at $759,124.38 and debts at $681,640.11.

Judge John M. Killits appointed W. J. Corr, secretary of the company, as receiver with power to continue the business. The property of the company was ordered sold.

A creditors' committee filed a similar petition with a plan for re-financing attached. Edward Kirby of the Commerce Guardian Trust & Savings Bank, Toledo, is chairman of the committee. The plan is to pay outstanding indebtedness with the proceeds of an issue of preferred stock.

Plant Fire Responsible

Difficulties of the company are said to be due to efforts to recover from a disastrous fire which swept away the plant at Racine, Wis., before the company moved to Sandusky.

A statement issued by the Maibohm company says that "unless unforeseen obstacles arise the receivership will terminate Nov. 14 and the reorganized company will take charge." It is stated that there will be no interruption of manufacturing operations.

The committee which has worked out the reorganization plans is headed by R. E. Hayslett, treasurer of the Hydraulic Steel Co. of Cleveland, N. T. Brotherton, president of the Brotherton-Knoble Co. of Detroit, and E. G. Kirby, vice-president of the Commerce Guardian Trust & Savings Bank of Toledo. All three are directors of the company.

Succeeded Former Company

The Maibohm Motors Co. was incorporated in Maine in 1917 as the successor to a company of the same name incorporated in Delaware a year earlier to take over the business and assets of the Maibohm Wagon Co. and Maibohm Rubber Co.

The authorized capital stock is $2,500,000 of which $1,780,000 is outstanding. There is no funded debt. Gross sales for the year 1920 were $1,897,658. The surplus for the year after payment of taxes, etc., out of the profits, $51,503, was $2,213.

H. C. Maibohm has been president of the company since its organization and recently has acted as general manager.

The plant of the company at Racine was burned Dec. 31, 1918, and it was decided to accept an offer from the city of Sandusky of 15 acres of land with a cash bonus of approximately $100,000. The new plant in that city has 75,000 sq. ft. of floor space.

Durant Car Sales Total $31,000,000

Contracts Signed up to Oct. 22 Call for 30,842 Deliveries by July 31, 1922

NEW YORK, Nov. 1—Durant Motors, Inc., has made public a remarkable affidavit signed by M. B. Leahy, general sales manager of the Durant Motor Co. of New York which controls the manufacture and sale of Durant cars for the New England and Atlantic Coast territory.

In his affidavit Leahy says that although the first Durant car was not placed on exhibition until Aug. 4 last, he had received at the close of business Oct. 22 a total of 24,817 shipping orders, based on signed contracts with deposits, for the four cylinder car, and 6025 contracts for the six cylinder car, or a total of 30,842. The contracts specified deliveries dating from Nov. 1 up to July 31, 1922.

Total Expense, $15,416

Leahy declares that this business, approximating $31,000,000, was obtained without the assistance of traveling men and that the total expense, including both sales and service departments, was $15,416 or an equivalent sales cost of one-twentieth of one per cent.

The assertion is made by Leahy that in his judgment the territory covered by the Durant Motor Co. of New York will produce a volume of business requiring the production of 140,000 automobiles in the next nine months.

Durant Motors, Inc., has issued a statement confirming the report that a contract has been closed with the Continental Motors Corp. for all motors for the Durant four cylinder car which will be made at Long Island City, Lansing, Oakland and Toronto. The statement says:

Continental Makes Ready

"That contract just closed provides for a mininum of 100,000 motors and involves, it is understood, between $12,000,000 and $15,000,000. The motors are to be built according to the specifications of Durant engineers.

"This is believed to be the largest single transaction in automobile parts negotiated.

"An interesting side-light in connection with this contract, which indicates the degree of confidence existing among big business men, is brought out in an interview given by President Judson of Continental Motors in which he states that upon Durant's assurance last April, when an order for a sample motor was placed, that a mutually satisfactory contract would eventually be signed, and upon Durant's verbal assurance only, Continental Motors invested in tools and special equipment necessary to expedite production upwards of $700,000."

LIMITS TIRE RECEIVERS

CLEVELAND, Oct. 31—Federal Judge Westenhaver has issued an order permitting operation of the Republic Tire & Rubber Co. of Youngstown and Canton under the receivership until further orders of the court. He declined to order continuance of the receivership for a year. The receivers are directed not to make contracts for fabric and other materials more than six months ahead.

MILEAGE GUARANTEE REPORT COMPLETED

NEW YORK, Nov. 1—The special committee of the tire manufacturers' division of the Rubber Association of America, which has been investigating all phases of the tire mileage guarantee, has presented its report to the division for adoption or rejection by the individual manufacturers.

While the report will not be made public until it is known definitely whether the general sentiment favors its acceptance, it is understood to recommend strongly the abolition of mileage guarantees. This is done on the theory that all reputable tires are good for more than the number of miles guaranteed and for that reason nothing is to be gained by continuing the practice. It is understood there is little doubt that the recommendations of the committee will be accepted.

Goodrich Tire Completes Preferred Dividend Year

AKRON, Nov. 1—The B. F. Goodrich Co. has successfully completed the year of preferred dividend payments. The directors' meeting at Akron, Oct. 26, provided for the preferred dividend of $1.75 a share payable on Jan. 2 to stockholders of record Dec. 22.

Although the statement to the directors by the officers of the company was not given out it was characterized by members of the board as exceedingly satisfactory.

The company has recently increased production to approximately 9000 tires a day after having sold two tires for each one manufactured during the past year.

The entire organization has been combed and placed in readiness for the expected increase in business early in the new year. Approximately 500 men were put to work immediately after inventory taking and this force will probably be gradually increased as the new year approaches and advances.

The company recently announced that the floating indebtedness of more than $30,000,000 has been reduced by $23,000,000 during the past year and that sufficient cash is on hand to liquidate the balance.

COMMERCE SETS PRICES

DETROIT, Nov. 1—The Commerce Motor Car Co. announces prices on the new Commerce truck as follows: 1¼-ton (pneumatic equipped) $1,450; 1½-ton, $1,695; 2-ton, $1,995; 2½-ton, $2,150. Pneumatic equipped on the three latter are $1,800, $2,150 and $2,495.

Government May Buy Highway Motor Stock

Subscriptions, Under Senate Bill, Would Constitute Loan to Corporations

WASHINGTON, Nov. 1—Senator Sheppard has introduced a bill to encourage highway motor transportation in this country by authorizing the Government to subscribe for stock in organizations created for the purpose and for the establishment of a national highway motor transportation bureau.

The bill provides that the sum of $100,000 be appropriated to enable the proposed motor transportation board to secure such expert assistance as it may deem advisable in carrying out the purposes of the proposed act.

Another appropriation of $7,200,000 would be authorized for the purchase of stock in corporations and would be issued by the Secretary of the Treasury to the corporation specified by the trade.

Provisions of Measure

The measure, which is known as S. 2631, further provides that it shall be shown to the satisfaction of the board (a) "that a corporation is in process of organization within a state, territory, or the District of Columbia, by reputable and reliable persons for the purpose of operating a highway motor transportation route at least fifty miles in length; (b) that the plans, resources, capital stock, rates, personnel, material, and probable business of such corporations are, or will be, of such nature or amount as to offer reasonable hope of success; (c) that the laws of the state, territory, or District in which the route is to be operated provide proper protection for the permanent operation of the corporation and proper construction and maintenance of the highway or highways to be utilized by the corporation. Under such conditions it is provided that the board for and in the name of the Government of the United States shall subscribe the last fourth of the capital stock of the corporation remaining unsubscribed."

Stockholders Must Apply

The proviso is inserted that application for such subscription must first be made in writing by the stockholders of the corporation over verified signatures. The rate of interest is fixed at 10 per cent. The amount paid by the Government will constitute a loan to the corporation, repayable with interest at the rate of 5 per cent per annum in ten annual installments, the first installment to be due five years after the date of subscription.

The issuance of stock is limited to six corporations within one State, territory or District of Columbia. Under the Sheppard bill, corporations would be obliged to make annual reports covering transactions and progress during the preceding year. There is a provision in the bill which prohibits the purchase of other stock unless subsequently authorized or directed by Congress. This bill has been referred to the committee on interstate commerce.

Trucks Have Forced Lower Rail Rates

Competition Impelled Executives to Ask for Revised Tariffs on Commodities

WASHINGTON, Nov. 1—Competition by automobile trucks has forced railroads to lower freight rates in cases where every other argument has failed. A study of the recent decisions of the Interstate Commerce Commission by a representative of AUTOMOTIVE INDUSTRIES showed that the cost of hauling by truck has decreased, while the rail carriers are finding it difficult to bring about economies essential to rate reductions.

The fact that several short line railroads have suspended operations owing to truck competition is a disturbing factor in the present agitation for cuts in freight rates. There has been some talk of regulation of motor trucks by the Federal Government but there are few who anticipate such action. It is believed that Federal regulation would find little favor in Congress at this time. Some traffic experts insist that laws regulating rail carriers would not be applicable to trucks.

Numerous Instances Shown

As to the effects of truck competition, the records show that there have been numerous instances where rates on commodities have been reduced on the request of rail carriers. Lincoln Green, vice-president of the Southern Railroad, very frankly admits that competition of trucks forces the lines to reduce their freight rates. He says:

"Our purpose in making these reductions in short-haul rates on cotton was primarily to meet truck and wagon competition not merely within the short radius of the consuming center, but for longer distances to which truck service has been extended, not merely taking cotton away from us at actual railway shipping points, but engaging in the transportation of other commodities in both directions.

"The matter has been under consideration for more than twelve months and our action is now taken in the belief that it is in the interest of the conservation of our revenues. Whether the proposed rates will actually enable us to meet the competition and continue to control a share of the traffic is a matter of experiment."

Truck Operation Decreasing

Just how it is possible for trucks to quote lower rates for the transportation of commodities has been illustrated by R. A. Brand, vice-president of the Atlantic Coast Line. He declares that the cost of hauling by truck is naturally on the decrease since wages, gasoline, trucks and parts are declining in price. In discussing conditions in a territory surveyed by the Charleston & Western North Carolina Railway of the Southern System, Brand said:

"It fairly may be assumed that the trucks are going to handle a certain amount of cotton in the Carolinas regardless of railroad freight rates, just as they are now doing as to freight traffic of all kinds as well as passenger traffic in sections along our lines traversed by improved highways. Trucks make warehouse delivery, which is of value, particularly as to small lots of cotton since drayage is avoided. A reduction in their rates may turn to the railroads some cotton now hauled by trucks, but the revenue derived from this additional cotton will not, as demonstrated by actual tests, already made for our line, affect the loss of revenue on cotton to interior mills alone.

"I do not believe that the interests of Southern cotton mills are adversely affected by the existing adjustment, nor that the producers of cotton will be benefited one iota by the reduction. A reduction in cotton rates will be an incentive to state commissions to bring about reductions in rates on other commodities, and will also be an invitation to shippers of other commodities to press for a general reduction in their rates."

(*Continued on page* 895)

OSHKOSH DELIVERS "GROCERY STORES"

OSHKOSH, WIS., Oct. 31—Four large "traveling grocery stores" have been built by the Oshkosh Motor Truck Co. and delivered under their own power to the U-Save-It Stores Corp. of Dayton, O., during the past week.

The cars were built on the standard four-wheel-drive chassis of the Oshkosh company and equipped with special bodies built by the J. L. Clark Mfg. Co. of Oshkosh. The Dayton company is conducting a "motor groceretaria" business, bringing a complete grocery store in miniature to the doors of housewives.

Erie Creditors Ask Collections on Stock

TOLEDO, Nov. 1—A committee of the creditors of the Erie Tire & Rubber Co., Sandusky, has filed an application in Federal Court here asking for an order of the court compelling the receiver to collect unpaid portions of stock subscriptions.

The application states that there is due on preferred stock $278,404, and on common stock, which was issued as bonus to purchasers of preferred, $1,029,986.

There are claims of more than $500,000 against the property and unless the unpaid portions of the stock subscriptions are paid the plant will have to be sold at a loss.

HINKLEY MOTORS SOLD

DETROIT, Nov. 2—Property of the Hinkley Motors Corp. was sold at public auction to-day by the Security Trust Co. as trustee. The property includes equipment approximately valued at $192,038; tool equipment valued at $41,100 and stores valued at $198,685. They will be offered in several parcels and also as a unit.

British Truck Sales Await Trade Boom

Impression Gained at Show is That Business Revival Must Come First

LONDON, Oct. 17 (*By Mail*)—Whether the British truck show will assist appreciably in lifting the truck industry out of the depression into which it has fallen in the past year remains a problem. The exposition itself has brought little in the way of actual sales and it is feared that until the general trade of the country revives there is not much hope that sales of commercial vehicles will increase to any extent.

There have been a good many inquiries for new motor coaches and omnibuses and firms which have a reputation for this type of vehicle, with a seating capacity of from 14 to 40, probably will pay their expenses and have something over. There also will be a few sales direct to the public of the smaller type of truck.

Many New Models

The proportion of new models at the show is surprisingly large and they are chiefly in the heaviest classes. In fact, trucks for bigger loads than ever before were suggested in England are among them. The Cadelon has a new model for 15,600 lb. net load while Maudslay has a new 13,500 lb. type with platform space 19 ft. 6 in. in length.

A half dozen makers are showing "overtype" trucks having the driver alongside or over the engine. Four of these are new. Guy has a new 2800 lb. net load chassis which has attracted much attention both in its design and price, which is slightly less than $2,000 and the lowest price high class British job of this kind.

Prospects for the passenger car show are difficult to forecast. The mild weather may induce a buying tendency but unhappily there is so little money available for the running and maintenance of cars that heavy sales are not probable. It appears that big cars will be in small demand for a long time to come. The public believes there will be a further drop in prices before the year ends.

South African Imports Decline During Year

NEW YORK, Oct. 31—Automotive trade conditions in British South Africa are summed up as follows in a cablegram from the National Bank of South Africa, Ltd., Capetown, to its branch here:

"Motor cars: Market tendency is better, country districts displaying more interest and a fair number of sales has been effected."

The dispatch also states that custom figures for the first seven months of the year, ending with July, show a falling off in automobile imports of 4758.

Factories Deny Canadian Rumors

Paige and Liberty Not Considering Assembly Plants—Hupp Marking Time

TORONTO, Oct. 31—Automobile business in Canada continues spotty. Companies which have made radical price reductions report excellent business. This applies to Canadian makes as well as imported lines. The general feeling is that next year will be good and 1923 excellent. The outlook of the average dealer is decidedly optimistic.

The air is full of rumors about American companies establishing Canadian factories. The passenger car companies included in this list are Liberty, Hupp and Paige. The International Harvester Co. has taken over a plant in Chatham and now produces International trucks there.

W. C. Durant has spent considerable of his time for the last two or three weeks in this city. Arrangements have been completed to go ahead with the Toronto plant and stock is being offered to the public. Durant Motors of Canada, Ltd., has not as yet decided whether to link up with A. L. Carron of Carron Brothers, Montreal, and take over their extensive munitions plant for export business.

It is understood that Durant personally favors this plan because it would keep the Toronto plant busy supplying parts to the assembling plant for export during slack seasons. Inasmuch as the plan affects Durant operations in the United States, the final decision is understood to rest with the board of directors.

Hupp to Build

DETROIT, Nov. 1—The Hupp Motor Car Corp. will erect a Canadian subsidiary plant in Windsor early in 1922 if the business outlook is regarded as favorable at that time. The company has acquired a site for a factory but will defer actual building operations until the time is considered ripe. Paige and Liberty are not considering Canadian assembling plants, they assert.

Vesta Looks Over Ground

MONTREAL, Nov. 1—Officials of the Vesta Battery Corp. of Chicago have been looking over plants and sites in Sherbrooke for the establishing of their Canadian branch factory. The reason given for the establishing of a Canadian plant is the increased Canadian and foreign demand for the batteries. Much of the company's export business from the United States will be carried on by their Canadian branch. The plant will start with 60 to 70 men with a pay roll of about $1,500 per week. It is expected operations will start within a few months.

RECEIVERS FOR DISTRIBUTOR

BOSTON, Oct. 31—Judge Morton, in the United States District Court, has appointed Edward A. Badol and Charles C. Barton as receivers under bonds of $10,000 each for Hares Motors Co. of New England, Inc. The concern was petitioned into bankruptcy recently by three creditors with claims of $8,000. A third receiver will be appointed later.

It is expected some plan will be worked out whereby the Locomobile company will regain possession of the big building on Commonwealth Avenue which it used as a branch until it was occupied by Hares Motors.

Willys Pays 10 Per Cent of Maturing Bank Loans

NEW YORK, Nov. 1—The Willys-Overland Corp. yesterday paid off in cash 10 per cent of its maturing bank loans of $18,000,000. The balance has been renewed for eight months. Bankers for the corporation say that the concern is in a comfortable cash position.

It is understood that entirely satisfactory progress is being made in the program for refinancing the Willys Corp. Details now are being worked out under which it is expected a banking syndicate headed by Kuhn, Loeb & Co. will underwrite a note issue of approximately $20,000,000. Business of the subsidiary companies within the corporation is steadily increasing and has been in satisfactory volume for some time. There are unofficial reports that operations will be started in the near future in the huge new Chrysler plant at Elizabeth, N. J.

Hartford Parts Sale Advised by Committee

NEW YORK, Oct. 31—The creditors' committee of the Hartford Automotive Parts Co., headed by A. E. Brion, has addressed a statement to creditors recommending the sale of the assets under the direction of the court. It is recommended that the committee be prepared to bid in the property for the purpose of operating it in the interest of the creditors until such time as it can be sold and converted into cash for distribution among them.

Claims deposited with the creditors' committee aggregate approximately $500,000. The statement points out that this plan would not jeopardize the interests of the stockholders or prevent reorganization by them, for such a reorganization could be effected by purchase of the assets at any sale the court may order.

Agents for Carbureter Given $55,000 Damages

CHARLOTTE, N. C., Nov. 1—Damage in the sum of $55,000 was awarded to the Southern Automatic Steam Carbureter Co. of Charlotte against the Automatic Steam Carbureter Co. of Chicago in Federal Court here. The Southern company asked for $150,000. The Chicago concern will appeal from the decision.

Studebaker Shows Gain for Quarter

Profits Exceed Year Ago by $976,407—Regular Dividends Declared

SOUTH BEND, IND., Nov. 1—The Studebaker Corp. to-day declared the regular quarterly dividends of 1¾ per cent each on its preferred and common stocks, both payable Dec. 1, stock record Nov. 10.

During the quarter ended Sept. 30 last the corporation showed net profits of $3,263,201, as compared with $2,286,794, an increase of $976,407 over the same period of 1920. For the nine months ended Sept. 30 last net profits amounted to $9,644,326, against $9,765,851 in the same nine months of 1920, or a decrease of $121,525.

The earnings statement for the quarter and nine months ended Sept. 30 compares as follows with the same period last year:

	1921	1920
Number cars sold	21,086	15,765
Sales and receipts	$29,058,893	$27,823,611
Net earnings	4,263,201	3,179,572
Reserve for federal tax.	1,000,000	892,777
Net profits	3,263,201	2,286,794
From Jan. 1:		
Cars sold	55,552	41,092
Sales and receipts	$80,593,998	$73,374,153
Net earnings	11,644,326	12,208,629
Reserve for federal tax.	2,000,000	2,442,777
Net profits	9,644,326	9,765,851

The profit and loss surplus as of Sept. 30 last stood at $15,396,874, as compared with $9,822,048 on Jan. 1, 1921, an increase of $5,574,826; cash in banks and on hand, $9,332,846, compared with $4,226,234; inventories on the same date were $20,594,985, against $28,076,793 on Jan. 1 last, a decrease of $7,481,808; total quick assets were $41,491,167, against $41,367,497, with current liabilities of but $11,161,791, compared with $16,337,164 on Jan. 1, 1921.

Pierce-Arrow Officials Dine George M. Graham

BUFFALO, Oct. 29—Officers, representatives of the board of directors and executive heads of the sales and manufacturing departments of the Pierce-Arrow Motor Car Co. gathered at the Ellicott Club last evening to bid goodbye to George M. Graham, who has resigned from the company to become the vice-president of the Chandler Motor Car Co.

Robert O. Patten, truck sales manager, introduced the speakers, who included Col. George W. Mixter, president; Col. Charles Clifton, chairman of the board of directors; John F. Guider, chief of production; Myron E. Forbes, treasurer, and L. E. Corcoran, passenger car sales manager. Others at the table included Robert F. Coleman, Joseph C. Dudley, C. D. Cowles, T. J. O'Rourke, Fred C. Wells, E. F. Himmele, Charles Sheppy and Walter P. Cooke.

G. M. Folder Gives Stockholders Data

They Are Informed That Every Sixth Motor Vehicle in Use Is Corporation Product

NEW YORK, Oct. 31—An interesting folder setting forth all the essential facts in reference to the various motor vehicles made by the General Motors Corp. are contained in a circular which is being mailed to stockholders with their dividend checks. The information includes the number of cylinders, wheelbase, weight and factory prices of all the models in the various lines together with the location of factories and distributors. A summary of prices of touring cars shows Chevrolet at $525 and $975; Buick at $975 and $1,525; Oakland at $1,145; Oldsmobile at $1,145, $1,625 and $1,735; Cadillac at $3,790. It is significant that Scripps-Booth is not mentioned in the circular.

A letter addressed to the stockholders by President duPont states that one out of every six motor vehicles in use in the United States is a General Motors product. He points out that "members of the immediate family share in the profits from every sale."

"Employees and stockholders are potential missionaries for General Motors. The institution—and users of General Motors cars are word of mouth advertisers of the products General Motors sponsors," says duPont. "If each of the employees and stockholders would interest himself to the extent of helping to convert but one new buyer a year, sales would be 33 per cent greater and profits accordingly larger."

President duPont points out that there are 133,500 persons in the General Motors family. These include 68,000 stockholders, 53,000 employees and 12,500 dealers and distributors. Since 1909 the corporation has produced more than 2,000,000 passenger and commercial cars, of which approximately 72 per cent are now in use.

Many American Cars Entered in Olympia

LONDON, Oct. 21 (*By Mail*)—Whatever the result of the approaching Olympia car show, interest is being manifested through a large entry list. The number of bona-fide car chassis, bodies, parts, tires and accessories, and exhibits in the marine section, will probably be 550.

American cars listed are the following makes: Willys-Knight and Overland; Dort, Hupmobile, Essex, Hudson, Paige, Nash, Packard, Dodge, Buick, Chevrolet, Oakland, Cadillac, Scripps-Booth, King, Owen-Magnetic, Moon, Alsace, Dixie-Flyer, Stanley, and possibly two makes assembled from imported American parts.

DALLAS TRADE IMPROVES

DALLAS, Nov. 1—The actual retail sales of automobiles on the part of retail dealers in Dallas for the month of October exceeded those of the preceding month from 10 to 15 per cent, according to statements of the various retailers in Dallas.

The retail dealers attribute this increase to three things:

First—Reduction in retail prices.

Second—Increased prices for cotton and grain which gave the farmers more money.

Third—The automobile show for sixteen days during the State Fair.

The dealers also claim that more advertising, better personal solicitation, more team work and generally increased activity contributed materially to the improved conditions in this section.

Monthly Report Issued on Motorcycle Exports

WASHINGTON, Nov. 1—Compilation of motorcycle export figures for each month by countries has been undertaken by the Bureau of Foreign and Domestic Commerce. This is the first time such figures have been made public.

The new division has announced that figures will be made public each month. The figures for September include both the number of machines shipped to each country and their value. The figures follow:

Countries	Number	Dollars
Belgium	18	4,931
Denmark	1	200
Esthonia	8	2,900
France	53	12,925
Greece	1	300
Italy	36	10,098
Netherlands	252	62,771
Poland and Danzig	1	271
Spain	54	15,310
Sweden	3	815
England	7	1,810
Ireland	1	150
Canada	68	4,796
Panama	4	1,063
Mexico	12	3,891
Jamaica	1	50
Trinidad and Tobago	3	1,250
Cuba	4	1,116
Dutch West Indies	1	344
Peru	1	225
China	1	325
Chosen	1	175
British India	1	376
Dutch East Indies	14	4,338
Japan	14	3,621
Palestine and Syria	1	212
Australia	60	15,320
New Zealand	1	225
Other British Oceania	1	431
British South Africa	4	1,141
Total	627	151,380

First Haynes Tractor Put on Seiberling Farm

KOKOMO, IND., Oct. 31—The first tractor manufactured by the Haynes Tractor Co. will be placed on the farm of A. G. Seiberling, vice-president and general manager of the Haynes Automobile Co., for further tests. According to John Powell, manager of the tractor company, and designer of the new product, no other machines will be manufactured until the first tractor has been fully tested.

N.A.C.C. Considers Contract Changes

Recommendations Made at N. A. D. A. Conference Presented to Directors

NEW YORK, Nov. 2—Recommendations for contract modifications which have been approved by a special committee of the National Automobile Chamber of Commerce after a series of conferences with representatives of the National Automobile Dealers Association, were submitted to directors of the N. A. C. C. at their monthly meeting here to-day. If the suggestions are approved by the directors they will be submitted to the individual manufacturers for such action as they see fit to take.

To Discuss Used Cars

The conferences between the special committees representing the two organizations have been marked by a spirit of cordiality and an honest desire to cooperate in solving problems which affect both branches of the industry. The proposed contract changes are in no sense radical but they are designed to remove some of the causes of friction which have arisen in the past.

After the directors have taken action on the contract changes, they will spend the major portion of their time wrestling with the used car problem. The N. A. C. C. has undertaken a survey of the entire situation with the idea of improving conditions which have become serious not only for dealers but for manufacturers as well. After the field has been carefully studied and analyzed the directors will make recommendations to improve conditions and also recommendations designed to aid in averting a ropetition of a similar situation in the future.

Hold Dealers at Fault

It is recognized that part of the present trouble is due to over production in the past but it is held that dealers also are somewhat at fault because they have accepted cars in trade-ins when it was not actually necessary to do so. Information is being gathered from all parts of the country as to the actual number of used cars remaining unsold and also full details of the most successful methods adopted in disposing of them. The N. A. C. C. knows that reports of a half million used cars on the market are greatly exaggerated. Although no definite figures are available at this time, it would not be surprising if the number did not exceed 350,000.

Many possible solutions of the problem are being submitted to the N. A. C. C. but most of them, if adopted, would be in restraint of trade. This is one of the most difficult elements in the situation because it will be impossible to take any stand which would cover the entire industry. Much valuable information in regard to successful selling plans is being received, however.

Trade Associations Favored by Hoover

States They Present an Indispensable Point of Contact With Government

WASHINGTON, Oct. 29 — Although the Administration has declined to make a formal definition of its attitude regarding trade associations, pending the decision in the Memphis Hardwood case, an informal interpretation of its position is believed to have been expressed by Secretary of Commerce Hoover when he addressed the Synthetic Organic Chemical Manufacturers' Association here.

Secretary Hoover and Attorney General Daugherty have held a number of conferences on this subject and are understood to have reached an agreement on the general principles involved and apparently were on the point of making a public announcement. At the last moment, however, Mr. Daugherty is said to have come to the conclusion that it would have been injudicious to take such action, in view of the litigation now before the Supreme Court. Mr. Hoover reiterated his past position in support of the legitimate activities of the trade association, which he held to be not only "an enormous power in commerce, but a tremendous power for good in industry and it represents a new step in the whole social and economic development of our business lives."

Co-operation Necessary

The various trade associations, Mr. Hoover said, present a point of contact for a department in the Government such as did not exist ten years ago, and by setting up a friendly relationship between the Department of Commerce and these associations, the Government is able to get in touch with the needs of all of the different branches of industry.

Mr. Hoover said he knew of no way by which it is possible to undertake the solution of collective questions relating to waste, adding as a preventive means, "except by the cooperative organization of the men in the industry; that we cannot go on and hope to make the progress that will maintain this standard of living in the face of the competition that we have in front of us, unless we can make some progress in the collective sense. So far as I know, the only way that we can hope for it is through the organization of associations that will take up the problems that are common to all, that gain inch by inch the efficiency and stability that make for national efficiency."

Pierce-Arrow Deficit Increases Last Quarter

NEW YORK, Nov. 2—A report of the Pierce-Arrow Motor Car Co. for the quarter ended Sept. 30 shows a deficit of $2,109,999 after charges, depreciation and Federal taxes. This compares with a deficit of $1,400,550 in the previous quarter and surplus of $355,310 in the corresponding quarter of 1920. The deficit for the nine months ended Sept. 30 amounted to $4,000,051 compared with a surplus of $1,778,354 for the corresponding period last year.

Directors of the company have set up a special reserve fund of $3,750,000, which is considered ample to provide for shrinkage in inventories and other contingencies. It is stated that future statements of operating results will benefit from the adjustment which has been made.

SUPPORT GATHERING FOR SALES TAX PLAN

WASHINGTON, Nov. 2 — Senators who are advocates of some form of a sales tax declare they have almost enough votes to insure putting through one of three plans offered by Senator Smoot of Utah as a substitute for the miscellaneous excise taxes contained in the pending bill.

It is asserted that at least half the Republican membership is prepared to support the sales tax plan which has been advocated by the automotive industry. Party lines seem to have been obliterated in consideration of taxation measures. So many of the excise taxes already have been voted out that abolition of the remainder would result in the loss of a comparatively small amount of revenue.

Republic Noteholders Asked for More Time

NEW YORK, Nov. 2 — The Republic Motor Truck Co. is mailing to noteholders to-day a request for an extension until 1926 on $500,000 of its $2,500,000 7 per cent serial notes which matured Nov. 1. The request is made because of business conditions, which have not permitted liquidation of sufficient inventories.

It was announced that a plan was in preparation, with the approval of the bankers, which provides for the payment of interest on the extended notes. The rate is to be increased to 8 per cent, it is said, and an adequate sinking fund will be provided. The same security will be given as under the present mortgage.

Confidence is expressed by the bankers that, with the extension plan adopted, the Republic company will be able to meet all its claims in full. It is understood that bank creditors have intimated their willingness to renew their loans.

In the balance sheet of Sept. 30, the company reports cash amounting to about $500,000, the amount of the note instalment due. The bankers have refused to let this be withdrawn, since it would leave the company without working capital. Current assets total $5,636,000 and current liabilities are about $1,941,000, making a net working capital of $3,695,000.

Brighter Outlook Seen in Colombia

One Company Handling American Lines Makes First Sales in Year

BARRANQUILLA, COLOMBIA, Oct. 17 (By Mail)—Considerable improvement is under way here in regard to automobiles. One company, representing two American lines, sold a number of cars during August and September, the first they had sold since October of 1920. This improvement is due to generally better business conditions, to improved exchange and to the fact that Colombian products are moving in better volume. Further progress is expected.

Registration figures as of this date show that 332 automobiles and about 60 motor trucks are operating in the city of Barranquilla. Reports from Cartagena, another of the Colombian seaports not far from here, place the motor vehicles in that city as approximating 90 passenger cars, 20 trucks and 10 buses. The importations through Cartagena last year were 182 automobiles, five trucks and eight tractors. Several tractors are in use in the Cauca Valley near here and a number of the tracklaying type are employed in various parts of the country by the oil companies.

Among the recent automotive events of importance here was the organization of the Sociedad Automoviliaria de Colombia, composed of dealers and car owners, its object being the furtherance of automotive development and the promotion of rural highway and city pavement construction. The first meeting was held early in September and plans were made to cooperate actively with the Asociacion Automoviliaria de Bogoto, which was formed some time ago in the Colombian capital with the same purposes as the Barranquilla organization.

Dry Goods Association To Hear Fenn on Trucks

NEW YORK, Nov. 3—F. W. Fenn, secretary of the motor truck committee of the National Automobile Chamber of Commerce, will address members of the National Retail Dry Goods Association at a dinner at the Aldine Club in this city Nov. 9 on the use of motor trucks for short hauls. The attention of the dry goods dealers was centered on the use of trucks because of the railroad strike threat and Fenn will tell them something of their advantages.

The big difficulty in the past has been lack of insurance against theft. Merchants have lost large quantities of valuable merchandise in this way and they will insist upon adequate protection before resorting on a large scale to the use of the trucks.

Fenn addressed the woodland section of the American Pulp & Paper Association at Chicago last night on the increasing use of trucks in that industry.

November Output to Meet October's

Factories in Detroit Where Changes Have Been Made Expect Increase

DETROIT, Nov. 2—Production in the Detroit district in November will continue along the steady levels maintained in October, with a slight falling off looked for in some factories. In others where there have been decreased prices, new models and intensive selling efforts, gains are anticipated.

Medium priced cars have been most affected by price fluctuations, factories reporting a hesitancy on the part of dealers to do any stocking up. Despite this, sales are running strongly.

Ford Motor Co., with a production which will total approximately 85,000 in October, will manufacture about the same number in November, sales being reported as steady in all parts of the country with every indication that they will continue so. Revival in export business is having an important part in maintaining Ford's high production marks.

Packard has come through with a strong October business and expects to improve on this in November owing to lower prices on the single six line. A production of 10,000 of this model was planned to be reached by December of this year. With a month left this total is assured and will be exceeded. Enclosed models in the twin six line are reported sold six weeks in advance. November production in this line will approximate October's. Truck business in November will show an increase of 100 per cent over October, which had shown gains over previous months.

Cadillac is continuing on its high production schedule of its new models.

Lincoln reports an October business on a par with September, and has set a high schedule for November.

Roamer is continuing in strong demand and executives look for steady business for the rest of the year.

Hupp, with a price cut restoring 1917 levels, looks for heavy business in November after a somewhat dull October.

Buick and **Studebaker** continue to lead in their field, October business showing a slight decline, however, from the earlier heavy production marks. November will show a still further curtailing.

Reo reports business as steady and satisfactory.

Oldsmobile will continue along at about the October pace.

Hudson-Essex, with new models in the former and lower prices in the latter, report sales running high in comparison with earlier months.

Earl Motors has fixed a schedule for 500 of the new Earl in November, in addition to which it will manufacture Briscoe to meet sales in this former model.

Maxwell has not set a manufacturing schedule for its new line, but orders are reported running high and heavy business is looked for.

Dodge continued in October its schedule of 550 cars daily and is starting November on approximately the same schedule.

Dort will continue its October schedules.

Saxon reports business better than for several months and looks for steady November sales.

Columbia reports good October business and finds the November outlook satisfactory.

October Car and Truck Shipments 96 Per Cent of Last Year; 11 Per Cent Below September, 1921

NEW YORK, Nov. 2—Reports of October shipments of passenger cars and trucks as compiled by the National Automobile Chamber of Commerce show that they aggregated 96 per cent of the total for the same month last year. It was the first month since the liquidation really got under way that shipments reached practically the same level as in the same period a year previous.

There is every reason to believe the comparison will be more favorable from now on. Gratification also is felt that October shipments showed a decline of only 11 per cent as compared with last month. Shipments for October of last year were 26 per cent less than for September. The shipment figures by months for this year and last follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
January	25,057	6,485	29,283	3,185	....	93
February	25,505	9,986	43,719	7,507	....	99
March	29,326	16,287	57,273	9,939	....	75
April	17,147	20,187	64,634	14,197	....	1,619
May	21,977	18,608	74,286	15,193	....	2,381
June	22,516	20,269	60,746	18,834	8,350	3,947
July	23,082	19,470	52,342	15,320	8,702	3,725
August	23,386	20,350	34,060	14,290	7,095	3,565
September	20,804	20,150	24,431	13,550	5,469	3,580
October	17,209	17,323	14,127	11,257	2,519	2,300

Trucks Have Forced Lower Railroad Rates

(*Continued from page* 891)

The Atlantic Coast Line recently filed a petition pointing out that owing to competition, reduction in rates on cotton and cotton linters in the Carolina territory will have to be made in Georgia, Florida and Alabama, with the probability of the reductions extended clear into Texas. These statements indicate that the extension of highway systems throughout the South is the one great factor in motor-truck transportation. The railroads knowing that competition of motor trucks lessened on long hauls proposed to reduce the short haul and increase the long haul rates but the South Carolina Commission would not permit this action.

It is interesting to note that the railroads, especially the Atlantic Coast Line, believe that the truck competition can only be successfully maintained in cases in which the haul is not more than 50 miles, and then only in territories in which there are good roads.

There are many other commodities affected by motor truck transportation. Refineries have saved large sums by having their products hauled by motor trucks, which is made clear by railroads asking to reduce rates.

W. R. Willett Heads Durant of Indiana

NEW YORK, Nov. 3—W. R. Willett, a veteran of the automotive industry, has been elected president and general manager of the Durant Motor Car Co. of Indiana, which will manufacture the six-cylinder Durant car in the former Sheridan factory at Muncie. A good share of Willett's business career has been spent with the General Motors Corporation. His latest work with that company was the organization of the Saginaw Products Co. division.

His apprenticeship in the industry was served in the Buick plant from 1904 to 1909. From 1909 to 1910 he was acting manager of the Rainier plant and later manager of the Welch Motor Car Co. at Pontiac for General Motors. He was works manager for the Gemmer Mfg. Co. of Detroit from 1913 to 1916, and later was general manager of the Chevrolet plant at Bay City, Mich. His first task will be to equip the Sheridan plant for the manufacture of the Durant six.

1,700,000 IN 1922

NEW YORK, Nov. 3—Careful estimates indicate that production of passenger cars and trucks for the calendar year 1921 will approximate 1,700,000 vehicles. This compares with 1,928,000 cars and 348,000 trucks, or a total of 2,276,000 for 1920. Inasmuch as it was predicted 1921 would be a "million car year" the output of motor vehicles has run far beyond expectations.

ADAMS WITH RICKENBACKER

DETROIT, Nov. 3—Charles Adams has resigned as production manager of the Maxwell Motor Corp. to become production manager for the Rickenbacker Motor Car Co. Adams has long been closely associated with B. F. Everitt, president of the Rickenbacker company.

Firestone Makes Price Reductions

Nothing Definite Decided by Goodyear or Goodrich to Meet Cuts

AKRON, Nov. 2—The Firestone Tire & Rubber Co. announced to-day that it had made a 20 per cent reduction in prices on cord tires, 10 per cent on fabric tires and 10 per cent on truck tires. This gives all tire purchasers the advantage of a 20 per cent discount offered to dealers some time ago effective until Oct. 31. The announcement evidences a sudden change of front by the Firestone company, which stated Monday that it did not contemplate continuing the 20 per cent discount which had been given to dealers.

It is considered probable that the other large tire manufacturers will be compelled to take similar action in order to meet competition, although there is said to be a possibility they may decide to let Firestone go it alone.

President E. G. Wilmer of the Goodyear Tire & Rubber Co., who declared Monday that he knew of no plan on the part of the larger tire companies to announce a general tire reduction, stated to-day that nothing definite had been done to meet the Firestone cut. A similar statement was made in behalf of the B. F. Goodrich company.

NEW YORK, Nov. 2—Tire companies with headquarters in this city are understood to be going over their schedules with the expectation of meeting the Firestone price cut but formal announcement will not be made until later in the week.

Changed Maxwell Prices Accompany New Models

DETROIT, Oct. 31—Closely following its announcement of new models the Maxwell Motor Corp. announces it has revised its prices. The list follows:

	Old Price	New Price
Roadster	$845	$885
Touring car	845	885
Coupe	1,445	1,385
Sedan	1,545	1,485

President Wilson states that 24,000 cars on hand when the reorganization of the company was completed have been sold as well as nearly all the 10,000 produced since that time. Former models on hand now average less than one-half car per dealer.

CHALMERS PRICES REDUCED

DETROIT, Nov. 1—The Chalmers Motor Car Co. has announced price reductions on its various models ranging from $150 to $400. The price revisions are as follows:

	Old Price	New Price
Roadster	$1,495	$1,245
5 passenger touring	1,545	1,295
7 passenger touring	1,795	1,395
Coupe	2,295	1,995
Sedan	$2,445	$2,295
Sport	1,695	1,445

DAVIS PRICES CUT

RICHMOND, IND., Oct. 31—The George W. Davis Motor Car Co. has reduced prices on the sedan and coupé from $2,795 to $2,595. The price of the touring car was reduced early this month from $1,895 to $1,695. The latest reductions combined with the June revisions make total reductions from the December, 1920, prices of from $455 to $590.

Tractor Manufacturers Make Price Revisions

CHICAGO, Oct. 31—The following reductions in the prices of tractors have been announced by the various manufacturers, effective immediately.

Name	Old Price	New Price
ARO	$550	$495
Aultman (22 to 45 rating)	3,850	3,420
Aultman (30 to 60 rating)	5,000	4,500
Caterpillar (25 rating)	4,250	3,975
Caterpillar (40 rating)	6,500	6,050
Centaur	405	385
Dart	2,100	1,800
Imperial	5,000	4,500
Kalumb	1.650	1,475
Peoria	1,785	1,600
Plowman	1,995	1,695
Port Huron	1,700	1,600
Allwork Model 2 G	1,875	1,775
Allwork Model 2 C	1,675	1,525

NEW WILCOX PRICES

MINNEAPOLIS, Oct. 31—The Wilcox Trux, Inc., has made reduction in price on all its models as follows:

	Old Price	New Price
1 ton	$2,100	$1,900
1½ ton	2,775	2,550
2½ ton	3,300	3,000
3½ ton	4,250	3,950
5 ton	5,200	4,350

TOWER REDUCES

ST. LOUIS, Oct. 31—The Tower Motor Truck Co. has reduced prices on its three models as follows:

	Old Price	New Price
1½ ton	$3,000	$2,900
2½ ton	3,475	3,200
3½ ton	4,400	4,100

REPUBLIC LOWERED

ALMA, MICH., Oct. 31—Prices of Republic trucks has been reduced, effective immediately, as follows:

	Old Price	New Price
1 ton	$1,695	$1,395
1½ to 2 ton	2,295	1,795
2½ to 3 ton	2,795	2,195
3½ to 4 ton	3,845	3,095

DOUGLASS TRUCKS REDUCED

OMAHA, Oct. 31—The Douglass Motors Corp. has reduced its 1½-ton truck from $2,050 to $1,850 and its 3-ton truck from $3,250 to $2,950.

WALTER TRUCK CUT

NEW YORK, Oct. 31—The Walter Motor Truck Co. has reduced the price of its 5-ton model from $5,600 to $4,850.

Committee Handles Mexico City Show

Twelve Dealers in Charge of Display Scheduled for Next Spring

NEW YORK, Nov. 1—Plans are now being made for the 1922 automobile show that will be held in Mexico City under the supervision of the automotive division of the American Chamber of Commerce of the Mexican capital. The show is to be held before the Mexican rainy season starts and after the New York and Chicago exhibitions, which, it is expected, will make it some time in March.

The show will be the second held in Mexico City, the first having taken place during April and May this year. The 1922 show, however, will be entirely different from the previous one, as it will be directed by a committee of automotive dealers of the capital and not by one man. The automotive division of the Chamber of Commerce, which was organized some months ago, plans to name a committee of 12 representatives who, through an executive committee, will be in charge of the show. The committee is to consist of six men representing the passenger car field and as many more representing trucks, tractors and accessories.

The preliminary plans, announced by S. L. Carrico, the Mexico City representative of the U. S. Rubber Co., provides for holding the show in the bull fight arena, a structure that affords ample exhibition facilities. Under the tiers of seats, Carrico explained, there are a number of large-sized rooms, connecting with each other and forming a large oval. These rooms will house the exhibits, the ring itself being reserved, if necessary, for the showing of heavy machinery, etc.

Automotive business throughout Mexico continues brisk, Carrico states, and, except for a possible seasonal decline, is expected to keep at a high pace.

NO CHANGE IN DODGE OWNERS

DETROIT, Nov. 1—Directors of the Dodge Brothers Motor Car Co. announce that no change in ownership or management is contemplated and that the company has entered into long term contracts with F. J. Haynes, the president, and John Ballantyne, the treasurer, who will continue in charge.

LOWER RAINIER PRICES

FLUSHING, Oct. 31—The Rainier Motor Corp. announces the following price revision on its trucks.

	Old Price	New Price
¾ ton	$2,150	$1,990
1 ton	2,350	2,150
1½ ton	2,600	2,490
2 ton	2,950	2,890
2½ ton	2,600	2,550
3½ ton	4,500	4,000
5 ton	5,250	5,100

Finds Improvement in Latin-America

Studebaker Representative Says Brazilian Market Offers Strongest Appeal

NEW YORK, Nov. 1—Confidence in the future of the automotive trade between this country and Latin-America is expressed by M. C. Reichert, manager of the New York export branch of the Studebaker Corp. Reichert has just returned from an extensive trip to Argentina, Uruguay and Brazil, and he has noted already an extensive improvement in the general trade conditions affecting those three countries.

The Brazilian market made an especial appeal to the Studebaker representative, and he expects that the coming months and years will witness an impressive expansion in our sales to that country. This will take in not only the larger cities into which the American car has gone in great numbers, but also will concern the smaller cities both along the coast and inland. Reports of large stocks of automobiles and automotive equipment in the Brazilian ports were denied by Reichert who believes that the generally quoted statements concerning unclaimed cars in the various Latin-American centers are both misleading and exaggerated.

So far as Argentina is concerned, before his departure from Buenos Aires in late August, some fears were being expressed that the year's crops would be seriously damaged by lack of rain. However, since then reports have reached him of generous rains and the crop situation looks quite optimistic.

"All countries of Latin-America are proceeding rapidly and satisfactorily in assimilating the belief that the motor car is an essential vehicle of transportation needed in the upbuilding of their vast territories," he said. "There can be no doubt about the standing of the American-made motor car there.

"Competition from the European makers is more of a threat than an actuality, thus far having been almost entirely in the field of high-priced limousines and similar cars. Our activities in these countries are continuing without a let-up and we naturally have high hopes that this belief will be justified in continuing and increasing business."

Trucks Led Federal Plan to Meet Strike

(*Continued from page* 888)

In the Middle West, Chicago was the mobilization center selected. It was not determined whether Washington or Pittsburgh would be the center for Maryland, Pennsylvania, Ohio, Virginia, West Virginia and Kentucky. Atlanta was selected as mobilization headquarters for the States of Tennessee, North Carolina, Mississippi, Alabama, Georgia, South Carolina, Florida and Louisiana. Kansas City was chosen as the center for Nevada, Colorado, Kansas, Oklahoma, Missouri and Arkansas, while Houston was to be the point of mobilization for Texas and New Mexico.

For Arizona, California, Nebraska and Utah, San Francisco was selected as the central point. Seattle was chosen as the mobilization point for Idaho, Oregon and Washington, while Aberdeen or Pierre was decided upon for Montana, Wyoming, North and South Dakota.

The administrative section of the plan called for the assistance of governors and their State organizations in securing interstate movement of the supplemental necessities that they might require, and to set up relations with food and fuel industries to assist in interstate or interregional movements of supplies, and also to secure co-ordination of railway and water movement in the delivery of these necessities to points in need.

Reeves Investigates Used Cars in Chicago

CHICAGO, Nov. 1—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has been in this city for several days to attend the annual meeting of the National Association of Business Executives. Between sessions of this body, Reeves spent as much time as possible with Chicago dealers, inquiring into the used car situation. In explaining this activity, Reeves said:

"The Chamber is going into the used car phase of the automobile business very seriously. Our contact with the dealer's committee has brought us much excellent information and the members of the Chamber realize the seriousness of this situation more than ever before.

"My conversations with Chicago dealers have been very helpful to me. There is one peculiar phase to this question—it is as interesting and important to talk to a dealer who is troubled with his used cars as it is to talk to a dealer who is moving the used cars rapidly and making money from them. We need information on all points of this question.

"I have obtained some very helpful information from Chicago dealers, some of whom are quite advanced in this phase of the work."

Louisiana Will Adopt Graduated License Tax

NEW ORLEANS, Nov. 1—A graduated license tax on tonnage and a flat rate of 68 cents per horsepower on trucks and automobile buses has been agreed upon by a committee of the Louisiana Legislature in session at Baton Rouge. The license, which will be in addition to the 68 cents per horsepower, has been graduated as follows:

Trucks	Per Thousand
750 to 4,000 pound	$10.00
4,001 to 5,000 pound	12.50
5,001 to 6,000 pound	15.00
6,001 to 8,000 pound	20.00
8,001 to 10,000 pound	25.00

The license proposed for auto buses would apply as follows: 1 to 7 passengers, $2.50 per passenger; 8 to 20 passengers, $3 per passenger.

METAL MARKETS

LITTLE change is looked for in the market for those steels that enter chiefly into automotive construction until purchasing agents place their first orders for the 1922 season. That the last attempt to lift sheet prices to the extent of $5 a ton proved an utter failure, should make for a conservative attitude in the matter of prices on the part of producers when 1922 demand sets in.

The market for strip steel is perhaps a shade steadier than it was, a condition, however, in no wise traceable to enlarged demand but solely to the fact that very little additional business for delivery before Dec. 31 is expected to be booked and that so far there is no chance to get any 1922 business on producers' books. Alloy steel makers have for so long been on short rations, as concerns orders from the automotive industries, that they will enthusiastically co-operate with prospective buyers and bring any possible sacrifice in order to broaden the outlet for their products.

Ferroalloys, moreover, have been liquidated with reference to price even more thoroughly than most other steel making raw materials. Nickel prices have been pruned likewise. All in all, if sellers show even the least sense of perspective, automotive buyers should be able to place 1922 orders, when the time for such contracts comes, without incurring the risk of driving prices upward to their own detriment, a danger that is always more or less present in seasonal buying by an entire industry.

What climbing aspirations pig iron values had, appear to have come in for a check due to the hesitancy of buyers to commit themselves until at least part of the 28 per cent freight rate cut on iron ores has been translated into price reductions on pig. In the steel industry, of course, the inability of the carriers to put into early effect further wage cuts which, in turn, precludes incisive reductions in freight rates generally is being used as a convenient argument to explain the impossibility of further price reductions.

Pig Iron.—Automotive foundries figure very little in the market, the majority having sufficient supplies on hand for present requirements.

Steel.—The sheet market remains at 3c. for black and 4c. for galvanized with blue annealed quoted at from 2.25c. upward. Full finished body sheets, 22 gage, are quotable at 4.35c. and upward. One of the low-priced passenger car builders continues to buy No. 9 gage tank steel quality sheets at the 1.75c. plate base price. Hot-rolled strip steel is relatively steady at 2.25c., with cold-rolled in light demand at from 3.75c. upward. Hot-rolled nickel steel (S. A. E. 2315-45) is nominally quotable at 4.50c.

Aluminum.—The new sheet prices of the domestic producer are still being cut by some of the importers of Swiss and German aluminum sheets. Quotations on the latter have ranged down to as low as 28c. for coils and 30c. for flats. Quite a few consumers, however, have been disappointed in the quality of some of these importations. British and French sheets are held on a parity with the domestic product. Somewhat higher prices are being asked for imported ingots by those who have them to offer.

Copper.—The market is once more pliable. There is talk of a resumption of production by the low-cost producers early next year.

INDUSTRIAL NOTES

Robert H. Hassler, Inc., has broken ground for the seventh unit of its plant at Indianapolis. The new building will be two stories in height and will add 15,000 sq. ft. of floor space to the manufacturing facilities of the company. It will be completed in from thirty to sixty days. An eighth building, larger than that now under construction, is planned for erection next spring. The company is producing over 1000 sets of shock absorbers daily for all models of Ford and Dodge Brothers' cars.

Lincoln Motor Car Co. shipped 302 cars in September, the original estimate being 200. The shipments for October will aggregate 300. Third quarter shipments were approximately 600 cars compared with 850 the second quarter and 340 the first. The company is obtaining greater production with 2000 men than with twice that number a year ago. The greatest output now is in higher priced enclosed models, the November outlook indicating production of a minimum of 200 cars.

Federal Rubber Co. of Cudahy, Wis., division of the Fisk Rubber Co., has increased the rate of operations to approximately 65 per cent of capacity, and expects to be able to make further increases in the coming sixty days as the result of the steady demand for goods from all sections, enforced largely by prevailing low dealer's stocks. The number of men employed at present is nearly 1200, compared with a normal force of 1800 and a full capacity force of 2000.

Moon Motor Car Co. reports that its plant is working full time and that production is up to capacity. October production schedule was 100 per cent greater than the schedule for the corresponding month of last year, and this increased schedule will hold good for the next three months, it is stated, due to the amount of orders on hand. It is estimated that 85 per cent of the cars shipped were of the enclosed type.

P. & J. Motor Co., Inc., of Cudahy, Wis., which was incorporated recently with $100,000 capital, is marketing an initial issue of $50,000 to build and equip a machine shop for the manufacture of an air-coo'ed, three-cylinder engine, developing 29.7 hp. at a piston speed of 2000 ft. p.m. Dr. B. F. Palmer is president; George C. Dutcher, vice-president, and A. Dretzka, secretary and treasurer.

Hendee Mfg. Co. states that it has received orders for over 4000 motorcycles since new prices were announced Sept. 1. At the annual meeting of the company, Henry H. Skinner was re-elected president, and Frank J. Weschler, treasurer. It is announced that the working force has been increased since Sept. 15 from 450 to 900 men and that the goal of 1000 would soon be reached.

Cutler-Hammer Mfg. Co. of Milwaukee has completed a new sales arrangement with Brandenburg Bros. & Eccleston of Chicago, New York and Detroit, for the sale in the United States of the products of the Gear shift department of the Milwaukee company.

Glenwood Motor Car Corp., which will locate its plant at Findlay, Ohio, within a few weeks, has elected C. F. M. Niles, H. Fort Flowers and William A. Hollington, all of Findlay, directors.

American Chain Co. has removed its general sales and export offices to Bridgeport but will continue its district sales office in the Grand Central Terminal, New York.

Oakley Machine Tool Co. has moved its factory and general offices to Middletown, Ohio, occupying part of the building of the Willard-Middletown Machine Co.

Root & Van Dervoort Corp. reports that the week ended Oct. 22 was the best in the company's history. New car orders actually entered totaled 48.

Niles-Bement-Pond Co. has obtained exclusive selling rights for the Cincinnati Hy-Speed Machine Co.

FINANCIAL NOTES

Wright Aeronautical Corp. reports net sales of $554,981 for the quarter ended Sept. 30. Net profits after reserve for taxes and including income from investments and patents amounted to $214,935, equal to 98c. a share of the 224,390 shares of capital stock. For nine months to Sept. 30 net earnings after taxes amounted to $1.91 a share on the stock. The total current debt is $184,000. Working capital is in excess of $2,000,000, this not taking into account a trust fund of approximately $2,800,000 set aside for contingent liabilities of the old Wright-Martin.

Root & Van Dervoort Corp. balance sheet for Sept. 30 shows cash in hand $81,913 against $631,932 as of Dec. 31, 1920. Notes and accounts receivable on Sept. 30 were $501,893 compared with $896,361, Dec. 31. The inventories on the latter date totaled $3,811,917 against $1,571,630 on the date under comparison. Notes and accounts payable on Sept. 30 were $2,889,698 and on Dec. 31, $3,730,288. The surplus last December was $1,466,792; in September they were $880,384.

General Tire & Rubber Co. announces that the last of its bank indebtedness has been paid off. A year ago in May the debts aggregated $2,000,000 which was $500,000 in excess of capital and surplus combined. By November the indebtedness had been reduced to $1,400,000. Sales for the present year, it is estimated, will be greater than for last year. The company has paid all dividends.

Fisk Rubber Co. combined income account for six months ended June 30, 1921, shows net income after depreciation and other charges, but before taxes, of $1,856,268. The net sales were $18,122,145; gross profit, after depreciation, $6,156,255 and administrative, selling and general expenses, $4,299,987.

B. F. Goodrich Co. has declared the regular quarterly dividend of $1.75 a share on the preferred stock, payable Jan. 2 to stock of record Dec. 22.

Franklin Automobile Co. regular quarterly dividend of 1¾ per cent on preferred stock was paid on Nov. 1 to stockholders of record Oct. 20.

DUPONT ISSUES STATEMENT

NEW YORK. Nov. 3—The following statement in reference to rumors regarding the policies of the General Motors Corp. has been issued by President du-Pont:

"It is but natural that there should have been constant gossip during the past few weeks while automobile price revisions were under way. The policies of General Motors with respect to certain of its manufacturing divisions were not immune, the future of Oldsmobile being the subject of persistent rumor.

"This division is in a healthy condition with its business stabilized and sales increasing in the face of the coming winter. The present line of passenger and commercial cars, with gradual improvements, will be continued for 1922 and 1923 selling seasons. Thereafter new models as may be required by the trade may be introduced."

House Passes Road Conference Report

Senate Action Will Be Expedited Following Passage of Taxation Bill

WASHINGTON, Nov. 2—By vote of 236 to 194 the House passed the conference report on the good roads bill. Every effort is being made to expedite passage in the Senate after the taxation bill is approved. However, it is expected that the anti-beer legislation will hold up enactment of the highway measure.

The principal opposition to the conference report was by Chairman Madden of the appropriations committee on the ground that it was sectional favoritism and extravagance.

The bill as passed by the House provides that the law shall be administered by the Department of Agriculture through the Bureau of Public Roads and not a commission. It also provides that the initiative in locating roads to receive Federal aid shall remain with the States. The several State highway departments, with the approval of the Department of Agriculture, shall lay out a system of roads, interstate and intercounty in character, and not interstate alone.

The funds from the several States put up to match Federal aid, from whatever source derived, shall be subject to the direct control of the highway departments of the several States.

The several States shall maintain and keep in good repair at all times all highways constructed with Federal aid. A penalty is provided for failure to put in proper repairs after 90 days' notice from the Department of Agriculture.

Open Meeting Arranged to Discuss Oil Status

NEW YORK, Nov. 2—The rapidly failing supply of oil from Mexican sources, which for some years has been depended upon to fill the widening gap between American domestic production and consumption, has made it necessary to consider seriously the possibilities of securing supplies from other foreign sources.

Because of this situation, Ralph Arnold, chairman of the petroleum and gas committee of the American Institute of Mining Engineers, has arranged for an open meeting in this city, Dec. 13 and 14, 1921, at which foreign oil possibilities and related subjects will be considered.

Among those persons scheduled to speak at the meeting are Secretary of Commerce Herbert Hoover, T. G. O'Donnell, Henry L. Doherty, David White and Joseph E. Pogue. It is a significant fact that the meeting is to occur when the oil resources of the world are being discussed in connection with the Armament Limitation Conference at Washington.

Oil resources are regarded as having great international significance.

MEN OF THE INDUSTRY

O. S. Tweedy and **J. F. Lanier** have become associated with the McKone Tire & Rubber Co. of Millersburg, Ohio, the former as general sales manager and the latter as southern distributor. Tweedy for many years was connected with the Diamond Rubber Co. and with the United States Tire Co. as general branch sales manager. Latterly he has been western sales manager of the C. Kenyon Co. Lanier was formerly associated with the Diamond Rubber Co., the Norwalk Tire & Rubber Co., and lately with the Howe Rubber Corp. as district manager

F. M. Benson, formerly connected with the sales departments of the Chevrolet Motor Co. and the Sheridan Motor Car Co., has left the General Motors Corp. to organize the Benson Motor Car Co. of New York which will distribute Bell trucks in the eastern territory including New York and the New England states. The company will specialize in one-ton trucks and will build up a dealer organization throughout this territory.

L. W. Coppock, production manager of the Kalamazoo Motors Corp., has organized the Kalamazoo Tire & Rubber Co., Kalamazoo, Mich., which has taken over a portion of the building in that city formerly occupied by the Kalamazoo Steel Goods Co. The company will manufacture the Kalamazoo cord tire, one size only, 30x3½ and a production of 1000 tires a month is the scheduled output for the next few months.

Leland F. Goodspeed, for the past five years or more chief of the engineering staff of the Roamer, has resigned from the Barley Motor Car Co. to join forces with the Commonwealth Motors Co. of Chicago and Joliet, Ill. Goodspeed has been elected vice-president in charge of engineering of the Commonwealth company, which at the present time is working on a new passenger car model.

J. T. Knight, until recently district manager of the Kelly-Springfield company's branch in Atlanta, has been appointed southern district manager of the Howe Rubber Co. of New Brunswick, N. J., and Cleveland, Ohio, with southern offices and branch in Atlanta. A large warehouse will be opened here to take care of the company's business in the southern field.

Ralph W. Hollenbeck has been appointed special sales representative in the motor truck division of the International Harvester Co. For a number of years he has been auditor of the Springfield, Ohio, works. He will be succeeded at Springfield by **Charles Miller.** For the present Hollenbeck will cover the Ohio territory.

H. A. Kimber, formerly of the Quigley Furnace Specialties Co., is now in charge of the sales of the Quigley Pulverized Fuel Department of the Hardinge Co., New York City. This change was made owing to the acquirement by the Hardinge company of the pulverized fuel department of the Quigley company.

C. H. Hobbs has been appointed assistant general manager of sales of the Detroit Seamless Steel Tubes Co. of Detroit. For over fourteen years Hobbs was associated with the Lackawanna Steel Co. and for the last five years served as district representative in charge of the Detroit office.

Louis A. Pratt and Roy Moore have organized the Pratt-Moore Advertising Agency in Detroit with offices in the Ford Building. Both men are well known in the industry having been connected with the advertising department of several important companies for a number of years.

William B. Hall, for the past four years in charge of General Motors Truck Co. advertising and other automotive accounts for the Green, Fulton, Cunningham Co., advertising agency, Detroit, has resigned to join the Dunlap-Ward Advertising Co. of Cleveland.

Robert I. Miner has been appointed sales engineer in the pressed steel division of the Motor Wheel Corp., Lansing. His activities will be devoted principally to handling the sales to car manufacturers of the Gier pressed steel plant of the corporation.

Fred W. A. Vesper, head of the Vesper-Buick Co. of St. Louis, and treasurer of the National Automobile Dealers Association, will be elected this month president of the St. Louis Chamber of Commerce.

Joseph Husson, general sales and advertising manager of the Northway Motors Sales Co., Boston, has resigned from that position as of Nov. 1. His future connections have not yet been announced.

William N. Davis has rejoined Cadillac Motor Car Co. as body engineer, after having resigned from a similar position with Lincoln Motor Co.

Rolls-Royce of America Votes to Pass Dividend

SPRINGFIELD, MASS., Nov. 2—The directors of Rolls-Royce of America, Inc., have voted to pass the quarterly dividend of $1.75 a share due preferred stockholders Nov. 1. As explained to the stockholders in a letter from L. J. Belnap, president, provision was made at the time of organization for such dividends during the period of construction, and an amount was set aside sufficient to pay five dividends.

Payments were made at regular intervals up to Aug. 1 last, from which date dividends on the stock became cumulative. In accordance with the schedule of operations, the statement goes on to say, the plant reached production May 1, and while earnings from that time have created a surplus, the directors do not deem it good judgment in view of the present depressed business conditions and in view of deferred charges during construction, to begin paying dividends at this time, but regular payments will begin as soon as the directors feel conditions justify it.

CURTISS HEADS TIFFANY

NEWARK, N. J., Nov. 2—C. W. Curtiss, formerly general manager of the Splitdorf Electrical Co. and later president and general manager of the Van Sicklen Speedometer Co., until its sale to the Stewart-Warner Speedometer Corp., has taken a substantial interest in the Tiffany Mfg. Co. of this city, of which he has been elected president.

Associated with him are Paul J. Landemare, secretary and treasurer, formerly treasurer of the Splitdorf company and later controller of the Van Sicklen company, and Carl T. Mason, chief engineer, formerly chief engineer of the Splitdorf company. The Tiffany company manufactures a line of high grade automotive electrical specialties.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

The fact that during the past week the United States Treasury was able to float a $200,000,000 issue of certificates of indebtedness at 4¼ per cent and 4½ per cent, the lowest rates since the latter part of 1919, the issue being over-subscribed by $400,000,000, is an indication of the general betterment of the credit situation. The week's local money market, however, showed signs of firmness. The range for call money was 5 per cent to 6 per cent, with 5½ per cent ruling, in comparison with 4 per cent to 5½ per cent the previous week.

The undertone for time money was also slightly firmer, and the rate for 60 and 90 day paper advanced to 5½ per cent, as compared with a range of 5¼ to 5½ per cent in the previous week. The quotation for the longer maturities up to six months advanced from a uniform rate of 5½ per cent to 5½-5¾ per cent. Prime commercial paper was in fairly good demand, with quotations maintained at 5½ per cent to 5¾ per cent.

Another outstanding event in the past week's market was the retirement by Great Britain of the amount still outstanding of the $150,000,000 of 5½ per cent United Kingdom of Great Britain and Ireland Secured Loan of 1916.

The Federal Reserve System's statement for Oct. 28 furnished proof that the position of the banks is materially stronger. The total reserve ratio increased from 70.3 per cent to 70.8 per cent. Total gold reserves stood at $2,786,239,000, an increase of $13,518,000, and the highest of the year. Federal Reserve notes in circulation at $2,408,779,000 showed a contraction of $32,083,000. Total bills on hand decreased $13,000,000, while total earning assets at $1,562,021,000 marked a decrease of $15,868,000, and a record low for the year, about 54 per cent below the peak figure reported for Oct. 15, 1920. Total deposits at $1,738,556,000 increased $21,112,000, of which $15,504,000 was attributable to Government deposits.

A significant, although not unexpected, event in the industrial world last week was the calling off of the strike set for Oct. 30. Although the United States Steel Corporation's net earnings as reported for the quarter ended Sept. 30 were better than had been expected, they were insufficient to provide funds for the full dividends on the preferred stock. The net earnings of the Bethlehem Steel Corp. for the same period, on the other hand, were more than sufficient to meet dividend requirements of preferred and common stock.

TRUCK CROSSES CONTINENT

NEW YORK, Nov. 1—A 5-6 ton pneumatic tired truck with six wheels, four of which are drivers, made a 3507-mile run from Los Angeles to New York in 6 days, 15 hours and 23 minutes

Calendar

SHOWS

Nov. 14-19—Jersey City, Second Annual Automobile Show of Hudson County Automobile Trade Association. Fourth Regiment Armory.

Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.

Jan. 28-Feb. 4—Chicago, Automobile Salon, Hotel Drake.

Jan. 7-13—New York, National Automobile Show, Madi-Automobile Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 28-Feb. 4 — Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.

Feb. 6 to 11 — Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.

Feb. 6 to 11 — Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

Feb. 20 to 25—Louisville, Ky., Louisville Automobile Show, Auspices Louisville Automobile Dealers Association.

FOREIGN SHOWS

Nov. 4-12 — London, British Motor Show, Society Motor Mfrs. and Traders.

Nov. 4-12—Car Show. Nov. 28-Dec. 3—Motorcycle Show.

Nov. 7-14—Paris, Seventh International Exposition of Aerial Locomotion in the Grand Palais of the Champs Elysees, Held by the Chambre Syndicale des Industries Aeronautiques.

Nov. 12-27—Buenos Aires, Annual Motor Show, La Pabellon de las Sosas, Automovil Club Argentino.

Nov. 26 - Dec. 3 — Shanghai, China, Automobile Show.

March, 1922 — Santiago, Chili, Annual Automobile Show.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Associcao Automobilista Brazileria.

CONVENTIONS

Nov. 14-19—Chicago, Annual Meeting and Business Exhibit of Automotive Equipment Association.

Nov. 15-16—New York, Convention of Factory Service Managers, National Automobile Chamber of Commerce.

Nov. 21-23—Atlanta, Third Annual Convention of American Farm Bureau Federation.

Dec. 6-8 — Chicago, Second Annual Meeting of American Petrolum Institute.

Dec. 10—New York, American Institute of Mining and Metallurgical Engineers.

Dec. 20—Philadelphia, American Society of Mechanical Engineers.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

Jan. 17-20, 1922—Chicago, American Road Builders Association.

Jan. 30-31—Chicago, Fifth Annual Convention, N. A. D. A., La Salle Hotel.

June 11-15—Milwaukee, Annual International Convention of the Associated Advertising Clubs of the World.

Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

S. A. E. MEETINGS

Detroit, Nov. 18, Dec. 23, Feb. 24, March 24, April 28, May 26.

New York, Jan. 11-14, 1922—Annual Meeting.

Chicago, Feb. 1

Minneapolis, Feb. 8—Tractor Meeting.

Australasian Trade Shows Improvement

Automobile Imports During First Half of Year Made Notable Increase

LOS ANGELES, Nov. 3—Latest reports received here from the automotive trades in the Australasian markets indicate that business conditions are appreciably improving.

Despite the distressing conditions prevailing in Australia and New Zealand during this year, the American automobile trade has not suffered to any large extent. As a matter of fact, the latest official statistics reaching here show that in some instances automobile imports have increased over the first half of 1920.

In the 1920-21 fiscal year, Australia imported motor chassis valued at £4,093,-108, as compared with total imports of motor chassis in the 1919-20 fiscal year amounting to £2,443,189, or an increase of £1,649,919. These statistics emphasize the remarkable development of the body building trades in Australia, which have been greatly encouraged by the high Australian tariff on imported bodies. As against the figures showing the imports of motor chassis the following statistics showing the imports of motor bodies stand in significant contrast: 1920-21 fiscal year, £194,719; 1919-20 fiscal year, £137,165, showing an increase of £57,554.

The total trade of the Commonwealth of Australia in the 1920-21 fiscal year amounted to £295,258,620, as compared with £248,797,801.

In New Zealand there has been a slight falling off in the imports of motor vehicles this year as compared with 1920. The total value of automobiles imported by New Zealand in the seven months ending July 31, 1921, aggregated £1,022,391, as compared with £1,499,801 in the same period of 1920 and £434,224 in the same period of 1919.

Under pressure of the government and the banks the import trade of New Zealand has been greatly restricted during the last few months. In fact, the total import trade for July was almost back to the pre-war level.

Automotive Merger Waits All Stockholders' Assent

NEW YORK, Nov. 1—Incorporators of the Associated Motor Industries which, it was announced last week, would take over the Jackson Motors Corp., do not contemplate making public the details of the merger, which will take in 19 automotive companies with assets of approximately $65,000,000, until early in January.

It is explained that while the officers of the various corporations which will be included have signed contracts, it will be necessary to obtain the consent of a majority of the stockholders in each corporation. Satisfactory progress is being made in this work but inasmuch as there are several hundred stockholders in some of the companies it will require a considerable period to complete the negotiations.

Cadillac Adopts Plan to Aid Used Car Sales

DETROIT, Nov. 1—The Cadillac Motor Car Co. is undertaking to assist dealers in handling used car sales through the establishment of a used car exchange of ideas which will be handled through the advertising department. Ideas of Cadillac dealers who are meeting the used car problem successfully in creating demand will be gathered into a brochure which will be distributed to all Cadillac dealers.

Copy and layouts for advertisements will be prepared in the advertising department and will be mailed to dealers.

Price Factor Leads in Peruvian Trade

Improvement in Exchange Accomplishes Reductions and Stimulates Business

LIMA, PERU, Oct. 17 — The predominant note in the automotive market in Peru lately has been the lowering of prices. This is revealed in the advertisements appearing in the daily press. When prices began to fall in the United States a year ago, merchants here were prevented from reducing prices for two reasons: First, there was an unfavorable turn in the exchange, the fall in the value of the Peruvian currency more than counterbalancing the fall in price abroad; second, the Peruvian Government raised the tariff rate on automotive products. For these two reasons, when prices were falling in the States, Peruvian merchants instead of reducing prices were compelled to advance them, much to the bewilderment of their customers.

More notable than either the sale of automobiles or tractors in Peru is the increasing use of trucks. The light one-ton truck or ¾-ton is selling better than the bigger trucks, though these are also becoming more numerous. The Peruvian Post Office Department has recently put in service several Albion (Scotch) trucks to haul mail.

BUYS WILCOX MOTORS' ASSETS

MINNEAPOLIS, Oct. 31—The Wilcox Trux, Inc., has acquired the interest of F. E. Satterlee as receiver of the H. E. Wilcox Motor Co. by purchase of the assets of the receivership. All future business in connection with the manufacturing, sale and service of Wilcox trucks will be handled by the new corporation at its offices 1030 Marshal Street, N. E., Minneapolis.